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PREFACE TO SECOND EDITION.

With the exception of three sections of Table II, the present edition embodies all of the matter given in the first volume. Twelve new tables of moments of inertia and squares of radii of gyration have been added, and the others have been extended so that the total number of sections has been increased from about 300 to 1,900.

The statement in preface of first edition that "the centers of gravity of each group are found at the same distance above the center of the web" will apply only to the last four tables of the present edition.

The table of values for $\frac{L^2}{r^2}$ will much facilitate the use of any form of Gordon's Formula, and particularly those given in this work. The arrangement of these tables for use of lengths of columns in feet, will, it is believed, meet with approval.

The table of square roots has been added principally for the benefit of the advocates and users of the straight line formula, and may be used to obtained the value of r from the tables, or the value of $\frac{L^2}{r^2}$ may be first obtained, and then the square root extracted, giving the value of $\frac{L}{r}$.

F. C. O.

Pittsburgh, Jan., 1889.

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PREFACE.

The aim of the author of the present work has been to supply, partially at least, a need felt by engineers and draughtsmen engaged in structural work in iron and steel.

The handbooks of our manufacturers are all quite complete far as the properties of their particular shapes are concerned but there is believed to be no work published, containing a collection of built sections of the forms in general use at the present time.

All of the sections given, are what are known as "open sections," being accessible for examination and painting; a condition required by the majority of specifications

There will be found a number of sections which do not comply with the quite common specification that "the unsupported width of any plate subjected to compresssion, shall not exceed thirty times its thickness," the designer to use his discretion as to when these sections are admissible.

It is to be noticed that the sections in each group are so proportioned that their centers of gravity are found at the same distance above the center of the web.

There are no interpolations in any of the tables, each value having been calculated and checked independently, and the figures given, may be relied upon as accurate.

F. C. O.

Pittsburgh, Feb., 1886.

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TABLES

OF

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MOMENTS OF INERTIA

AND

SQUARES OF RADII OF GYRATION;

SUPPLEMENTED BY OTHERS ON

THE ULTIMATE AND SAFE STRENGTH

OF

WROUGHT IRON COLUMNS.

Engineering Library

BY

FRANK C. OSBORN, C. E.
M. AM. SOC. C. E.

ember of the firm of G. W. G. Ferris & Co., Civil Engineers, Inspectors of Structural Iron and Steel; and of the firm Robert W. Hunt & Co., Bureau of Inspection, Tests and Consultation.

SECOND EDITION.

PUBLISHED BY ENGINEERING NEWS PUBLISHING CO., TRIBUNE
BUILDING, NEW YORK CITY.
1889.

Entered according to Act of Congress, in the year 1889, by
FRANK C. OSBORN,
In the office of the Librarian of Congress, at Washington.

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WOOD ST , PITTSBURGH, PA.

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CONTENTS.

Page.

Explanation, ... 7–11
Moments of Inertia, Rectangles, ... 12–13
Squares of Radii of Gyration, Two Angles, . . 14
" " " Four Angles, . . . 15

MOMENTS OF INERTIA AND SQUARES OF RADII OF GYRATION:

Four Angles and One Web Plate, ... 16–19
Two Plates and One Separating Channel, . . 20–25
Two Channels and One Top Plate, . . . 26–27
Two Channels and One Separating I Beam, . . 28–32
Three I Beams, ... 33
One Web Plate and Two Angles, . . . 34–37
One Web Plate, Two Angles and Top Plate, . 38–39
Two Web Plates, " " " " . 40–41
Two Web Plates and Four Angles, . . . 42–53
Two Web Plates, Two Side Plates and Four Angles, 54–55
Two Web Plates, Four Angles and Top Plate, . 56–63
Two Web Plates, Four Angles, Top Plate and Vertical Flange Plates, ... 64–65
Two Web Plates, Four Angles, Top Plate and Horizontal Flange Plates, ... 66–67
Three Web Plates, Eight Angles and Top Plate, . 68–69

Values of $\frac{L^2}{r^2}$ 70–80
Ultimate Strength of Wrought Iron Columns, . . 81–83
" " " " " . . 84–86
" " " " " . . 87–89

SAFE STRENGTH PER SQUARE INCH OF

Two Channels Latticed, Two Square Ends, . 90-91
" " " Pin and Square, . . 92–93
" " " Two Pin Ends, . . 94–95

Table of Square Roots, ... 96–103
Bending Moments for Various Loads and Spans, . . 104
Capacity of Timber Beams, ... 105–107
Conventional Signs for Bridge Rivets, . . 108–109

EXPLANATION.

The shapes used in the following tables are those manufactured by the firm of Carnegie Bros. & Co , Limited, Pittsburgh, Pa. The moments of inertia of sections made up of plates and angles, or of angles only, will not, however, vary materially for shapes of same size and weight made by other manufacturers.

Sections made up of channels and I beams will vary somewhat in moment of inertia, as there is less uniformity in these shapes, as made by different manufacturers, than in angle irons.

In all cases calculations have been based on the gross area, and if it is desired to use the sections as beams to resist direct bending due allowance should be made for loss of section from rivet holes in tension flanges.

In general when angles with unequal legs are used, the shorter leg is placed against the web. An exception to this rule occurs in sections 155 to 173 inclusive, on page 63. In these sections the 4″×6″ angles have the long leg against the web. Attention is called to another feature of these sections, which is, that the center of gravity just bisects the space on the web between the top and bottom angles, and therefore when the pin is placed in the center of gravity, of the section, as it usually should be, it will also be in the center of the pin plate; any strain, then, which is transferred from the pin plate to the column will be transferred symmetrically. Another advantage in having the center of gravity in this particular position is, that in case it is desired to increase the sections as given in the table, it may be done by adding side plates and without disturbing the position of the center of gravity.

The following example will illustrate the general method pursued in obtaining the moment of inertia and square of radius of gyration for sections composed of two plates and four angles riveted as shown on page 43 :

2 plates $12 \times \frac{1}{4} = 6.00$ sq. ins.
4 angles $2\frac{1}{2} \times 3$ – 4.4 lbs. $= 5.28$

Total, 11.28 sq. ins.

$\div 12 \times 12^2 = 72.00$
$\times\ 5.34^2 = 150.56$
$4 \times 0.74 = 2.96$

$I = 225.52$

$225.52 \div 11.28 = 19.99 = r^2$.

The moment of inertia of the plates being $\frac{1}{12}bd^3=\frac{1}{12}Ad^2$ in which b=breadth, d=depth, and A the area of the plates, and the moment of inertia of each angle being ad^2+i, when a equals the area of the angle, d the distance of its center of gravity from the neutral axis, and i, its moment of inertia about an axis through its own center of gravity perpendicular to the web In the above example, 5.34 inches is the distance from center of gravity of angle to center of web, and 0.74 is the moment of inertia of one angle, about an axis through its center of gravity, as given in Carnegie's Pocket Companion The area of each angle is found from the weight per foot, by multiplying the latter by .3.

For trough-shaped sections it is convenient to first determine the position of the center of gravity, which is done as follows: Multiply the area of the top plate, top angles, webs and bottom angles, each by the distance of its center of gravity from the lower edge of web. Divide the sum of these products by the total area of the section, and the result will be the distance of the center of gravity above the lower edge of web:

	sq, ins.			
Top plate $15\times\frac{3}{8}=$	$5.63\times$	$14.19=$	79.89	$5.63\times7.19^2=291.05$
2 top angles 3×3—5.9 lbs.=	$3.54\times$	$13.14=$	46.52	$3.54\times6.14^2=133.46$
2 web plates $14\times\frac{3}{8}=$	$10.50\times$	$7.00=$	73.50	$10.50\div12\times14^2=171.50$
2 bot. angs. 3×3—10.1 lbs =	$6.06\times$	$0.98=$	5.94	$6.06\times6.02^2=219.62$
				$+8.51$
	$25.73\times$	$8.00=$	205.85	
		7.00		824.14
deduct	25.73×1.00^2			$=25.73$
				$I=798.41$

$$r^2=798.41\div25.73=31.03.$$

Find the moment of inertia of the section about an axis through the center of the web, as follows: Multiply the area of the top plate, top angles and bottom angles, each by the square of the distance of its center of gravity from the center of web; add to these results the moment of inertia of the webs, which may be taken from the table on page 13, and the moment of inertia of each angle about an axis through its center of gravity. From the result subtract the product of the area of the section by the square of the distance from the neutral axis to the center of the web, and the result will be the required moment of inertia of the section about an axis through the center of gravity perpendicular to the web.

The moment of inertia of the top plate about an axis through its center of gravity should, strictly speaking, be added to the above, but its value, in the present instance is so small that the final result is not materially affected.

A somewhat easier method, especially when the operation has to be performed without the aid of a slide rule is the following:

Top plate 15 × ⅜ =	5.63 ×	7.19 = 40.48	× 7.19 = 291.05
Top angles 3 × 3—5.9 lbs. =	3.54 ×	6.14 = 21.74	× 6.14 = 133.46
		———	
Web plates 14 × ⅜ =	19 50	62.22	171.50
Bot. angs. 3 × 3—10.1 lbs =	6.06 ×	6 02 = 36.48	× 7.02 = 219.62
	———	———	+ 8.51
	25.73 ×	1.00 = 25.74	———
	———		824 14
deduct	25.73 × 1.00^2		= 25.73
			———
			798.41

This plan avoids the use of squares in getting the moment of inertia and saves one multiplication in getting the position of the center of gravity.

The word *eccentricity* is used in the tables to denote the distance of the center of gravity of the section above the center of the web.

In the expression $\frac{T\text{-}B}{A}$, which may be called a *coefficient of eccentricity*, T represents the area of the top plate and top angles, B the area of the bottom angles and flange plates, if any are used, and A the total area of the section. This coefficient is used in proportioning *for the same eccentricity*, sections similar to those in the tables but of different areas.

EXAMPLE: Required a section of 53.30 square inches, with an eccentricity of 1½ inches —

Referring to page 61, section 124, we find 53.03 the area nearest to that required and its coefficient, .1469: now if $\frac{T\text{-}B}{A} =$ .1469,

we will have T—B=A×14.69 =53.30×14.69= 7.83
and T+B=A—area of webs=53.30—27.00=26.30
by addition 2 T =34.13
and therefore T =17.06
B=26.30—17.06 = 9.24

17.06—13.13= 3.93=area required in top angles.
3.93÷ .6 = 6.6 =lbs. per foot for each top angle.
9.24÷ .6 = 15.4= " " " bot. angle.

In the calculation of these sections for moments of inertia sideways, the distance out to out of webs was assumed equal to the width of top plates, less twice the nominal length of leg of top angle.

The sections beginning with 127, on page 61, and extending to 154, on page 63, are designed for use in such cases as top chords which support the floor directly and are, therefore, subjected to bending strains as well as direct compression.

The table for *two angles*, page 14, is based on the assumption that the angles are attached to each other securely enough to act as one member; if the angles are not so connected then the least value of r^2 for one angle should be used, and the column considered as two separate members.

By means of the table of values of $\frac{L^2}{r^2}$ the ultimate strength of any column for which r^2 is known, can be readily obtained.

EXAMPLE. Required the ultimate strength of a column 18 feet long, square at both ends, made up as section 22 on page 57.

The value of r^2 is 33.0 and the area 30.00 square inches.

Referring to table of $\frac{L^2}{r^2}$, look down the column headed r^2 until we come to 33.0; then in the same horizontal line, under 18, find 10 for the value of $\frac{L^2}{r^2}$; referring now to the tables of ultimate strength, say that on page 84 we find opposite 10 the ultimate strength per square inch of 38462 lbs. The total ultimate strength of the column will then be—

38462×30=1153860 lbs.

The safe strength will be one-fourth or one-fifth of this amount, depending upon the character of the load to be sustained.

The tables on the safe strength of two channels, latticed, will greatly facilitate the work of proportioning such sections, giving, as it does, the allowable strain per square inch for channels of five to fifteen inches depth, and column lengths of ten to forty feet. The total safe strength of column, given in thousands of pounds, (in small figures above the strain per square inch) enables the designer to select, not only the channels that will answer his purpose, but at the same time the ones that will be most economical in material.

The use of the tables of bending moments and capacity of timber beams will be, perhaps, best illustrated by the following:

EXAMPLE. Required the size of joist to support a load of 100 lbs. per square foot, the length of span being 18 feet and the greatest allowable strain 1000 lbs. per square inch.

Assume the weight of joists and flooring to be 20 lbs. per square foot.

From the table of bending moments we find for—

20 lbs. per square foot and 18 foot span, 1620 foot lbs.
For 100 " " " 18 " 8100 "
Total bending moment=9720 "

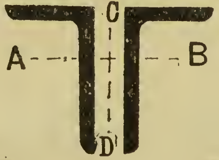
Referring now to the table of capacities for 1000 lbs. fiber strain we find that 3″×16″, 3½″×15″ or 4″×14″ will answer the purpose, the 3″×16″ being the most economical in material.

MOMENTS OF INERTIA. .... ▮ .... RECTANGLES.

Depth in Inches.	Width of Rectangle in Inches.						
	¼	$\frac{5}{16}$	⅜	$\frac{7}{16}$	½	$\frac{9}{16}$	⅝
3	0.56	0.70	0.84	0.98	1.13	1.27	1.41
4	1.33	1.67	2.00	2.33	2.67	3.00	3.33
5	2.60	3.26	3.91	4.56	5.21	5.86	6.51
6	4.50	5.63	6.75	7.88	9.00	10.13	11.25
7	7.15	8.93	10.72	12.51	14.29	16.08	17.86
8	10.67	13.33	16.00	18.67	21.33	24.00	26.67
9	15.19	18.98	22.78	26.58	30.38	34.17	37.97
10	20.83	26.04	31.25	36.46	41.67	46.87	52.08
12	36.00	45.00	54.00	63.00	72.00	81.00	90.00
13	45.77	57.21	68.66	80.10	91.54	102.98	114.43
14	57.17	71.46	85.75	100.04	114.33	128.63	142.92
15	70.31	87.89	105.47	123.05	140.63	158.20	175.78
16	85.33	106.67	128.00	149.33	170.67	192.00	213.33
17	102.35	127.94	153.53	179.12	204.71	230.30	255.89
18	121.50	151.88	182.25	212.63	243.00	273.38	303.75
20	166.67	208.33	250.00	291.67	333.33	375.00	416.67
21	192.94	241.17	289.41	337.64	385.88	434.11	482.34
22	221.83	277.29	332.75	388.21	443.67	499.13	554.58
23	253.48	316.85	380.22	443.59	506.96	570.33	633.70
24	288.00	360.00	432.00	504.00	576.00	648.00	720.00
25	325.52	406.90	488.28	569.66	651.04	732.42	813.80
26	366.17	457.71	549.25	640.79	732.33	823.88	915.42
27	410.06	512.58	615.09	717.61	820.13	922.64	1025.16
28	457.33	571.67	686.00	800.33	914.67	1029.00	1143.33
29	508.10	635.13	762.16	889.18	1016.21	1143.23	1270.26
30	562.50	703.13	843.75	984.38	1125.00	1265.63	1406.25
32	682.67	853.33	1024.00	1194.67	1365.33	1536.00	1706.67
34	818.83	1023.54	1228.25	1432.96	1637.67	1842.38	2047.08
36	972.00	1215.00	1458.00	1701.00	1944.00	2187.00	2430.00
38	1143.17	1428.96	1714.75	2000.54	2286.33	2572.13	2857.92
40	1333.33	1666.67	2000.00	2333.33	2666.67	3000.00	3333.33
44	1774.67	2218.33	2662.00	3105.67	3549.33	3993.00	4436.67
46	2027.83	2534.79	3041.75	3548.71	4055.67	4562.63	5069.58
48	2304.00	2880.00	3456.00	4032.00	4608.00	5184.00	5760.00
50	2604.17	3255.21	3906.25	4557.29	5208.33	5859.38	6510.42
60	4500.00	5625.00	6750.00	7875.00	9000.00	10125.00	11250.00

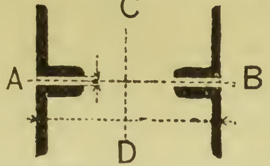
Width of Rectangle in Inches.						Depth in Inches.
$\frac{11}{16}$	¾	$\frac{13}{16}$	⅞	$\frac{15}{16}$	1	
1.55	1.69	1.83	1.97	2.11	2.25	3
3.67	4.00	4.33	4.67	5.00	5.33	4
7.16	7.81	8.46	9.11	9.77	10.42	5
12.38	13.50	14.63	15.75	16.88	18.00	6
19.65	21.44	23.22	25.01	26.80	28.58	7
29.33	32.00	34.67	37.33	40.00	42.67	8
41.77	45.56	49.36	53.16	56.95	60.75	9
57.29	62.50	67.71	72.92	78.13	83.33	10
99.00	108.00	117.00	126.00	135.00	144.00	12
125.87	137.31	148.75	160.20	171.64	183.08	13
157.21	171.50	185.79	200.08	214.38	228.67	14
193.36	210.94	228.52	246.09	263.67	281.25	15
234.67	256.00	277.33	298.67	320.00	341.33	16
281.47	307.06	332.65	358.24	383.83	409 42	17
334.13	364.50	394.88	425.25	455.63	486.00	18
458.33	500.00	541.67	583.33	625.00	666.67	20
530.58	578.81	627 05	675.28	723.52	771.75	21
610.04	665.50	720.96	776.42	831.87	887.33	22
697.07	760.44	823.81	887.18	950.55	1013.92	23
792.00	864.00	936.00	1008.00	1080.00	1152.00	24
895.18	976.56	1057.94	1139.32	1220.70	1302.08	25
1006.96	1098.50	1190.04	1281.58	1373.13	1464.67	26
1127.67	1230.19	1332.70	1435.22	1537.73	1640.25	27
1257.67	1372.00	1486.33	1600.67	1715.00	1829.33	28
1397.29	1524.31	1651.34	1778.36	1905.39	2032.42	29
1546.88	1687.50	1828.13	1968.75	2109.38	2250.00	30
1877.33	2048.00	2218.67	2389.33	2560.00	2730.67	32
2251.79	2456.50	2661.21	2865.92	3070.63	3275.33	34
2673.00	2916.00	3159.00	3402.00	3645.00	3888.00	36
3143.71	3429.50	3715.29	4001.08	4286.88	4572.67	38
3666.67	4000.00	4333.33	4666.67	5000.00	5333.33	40
4880.33	5324.00	5767.67	6211.33	6655.00	7098.67	44
5576.54	6083.50	6590.46	7097.42	7604.38	8111.33	46
6336.00	6912.00	7488.00	8064.00	8640.00	9216.00	48
7161.46	7812.50	8463.54	9114.58	9765.63	10416.67	50
12375.00	13500.00	14625.00	15750.00	16875.00	18000.00	60

TWO ANGLES.



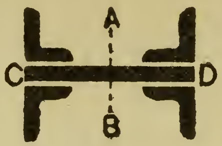
Number.	Two Angles.		Total Area in Square Inches.	Axis A B. r^2	Axis C D. Values of r^2 for Distances back to back of—										
	Size in Inches.	Lbs. Per Foot.			0	¼	⅜	½	¾	1	1¼	1½	1¾	2	2½
1	2 ×2½	3.5	2.10	0.61	0.64	0.79	0.88	0.98	1.19	1.43	1.71	2.02	2.35	2.72	3.56
2	2 ×3	4.0	2.40	0.92	0.57	0.70	0.78	0.87	1.07	1.31	1.57	1.86	2.19	2.55	3.35
3	2½×2½	4.9	2.94	0.58	1.13	1.33	1.44	1.56	1.82	2.12	2.44	2.80	3.19	3.61	4.54
4	2½×3	4.4	2.64	0.88	1.00	1.18	1.28	1.39	1.63	1.91	2.21	2.55	2.92	3.32	4.21
5	3 ×3	5.9	3.54	0.85	1.59	1.82	1.95	2.09	2.38	2.70	3.06	3.45	3.86	4.31	5.31
6	3 ×3½	7.7	4.62	1.19	1.49	1.71	1.84	1.97	2.25	2.57	2.92	3.30	3.71	4.15	5.13
7	3 ×4	8.3	4.98	1.59	1.38	1.59	1.71	1.83	2.10	2.41	2.75	3.11	3.51	3.94	4.89
8	3 ×4½	8.9	5.34	2.04	1.29	1.49	1.60	1.72	1.98	2.28	2.60	2.96	3.35	3.77	4.70
9	3 ×5	9.5	5.70	2.56	1.21	1.40	1.50	1.62	1.87	2.16	2.47	2.82	3.20	3.61	4.52
10	3½×3½	8.3	4.98	1.21	2.17	2.44	2.59	2.74	3.07	3.43	3.83	4.25	4.71	5.19	6.23
11	3½×4	8.9	5.34	1.56	2.04	2.30	2.44	2.58	2.90	3.25	3.63	4.04	4.49	4.96	6.00
12	3½×5	10.2	6.12	2.56	1.78	2.01	2.14	2.27	2.56	2.89	3.24	3.63	4.05	4.50	5.49
13	3½×6	11.4	6.84	3.76	1.59	1.81	1.92	2.05	2.32	2.63	2.97	3.34	3.74	4.17	5.13
14	4 ×4	9.5	5.70	1.44	2.83	3.13	3.29	3.46	3.82	4.22	4.64	5.10	5.59	6.11	7.24
15	4 ×5	10.8	6.48	2.56	2.50	2.77	2.92	3.08	3.42	3.78	4.18	4.61	5.07	5.56	6.64
16	4 ×6	13.9	8.34	3.61	2.27	2.52	2.66	2.81	3.13	3.48	3.86	4.27	4.71	5.19	6.23
17	6 ×6	19.2	11.52	3.61	6.28	6.71	6.94	7.18	7.68	8.21	8.77	9.36	9.98	10.64	12.04
18	6 ×6	39.2	23.52	3.61	7.51	8.01	8.28	8.55	9.12	9.72	10.35	11.01	11.70	12.43	13.97

FOUR ANGLES.



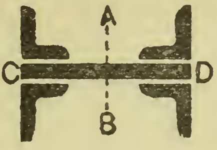
	FOUR ANGLES.		Total Area Square Inches.	AXIS A B.							AXIS C D.					
	Size in Inches.	Lbs. per Foot.		Values of r^2 for Distances back to back of—							Values of r^2 for Distances back to back of—					
				¼″	5/16″	⅜″	½″	⅝″	¾″	1″	6″	7″	8″	9″	10″	12″
1	2 ×2½	3.5	4.20	1.46	1.51	1.57	1.70	1.83	1.98	2.28	6.40	9.11	12.32	16.03	20.24	30.16
2	2 ×3	4.0	4.80	2.15	2.22	2.29	2.45	2.60	2.77	3.13	6.63	9.39	12.65	16.41	20.67	30.69
3	2½×2½	4.9	5.88	1.33	1.38	1.44	1.56	1.69	1.82	2.12	5.69	8.20	11.21	14.72	18.73	28.25
4	2½×3	4.4	5.28	1.96	2.02	2.09	2.23	2.38	2.54	2.87	6.04	8.63	11.72	15.31	19.40	29.08
5	3 ×3	5.9	7.08	1.82	1.89	1.95	2.09	2.23	2.38	2.70	......	7.82	10.71	14.10	17.99	27.27
6	3 ×3½	7.7	9.24	2.63	2.71	2.78	2.95	3.12	3.29	3.67	......	7.93	10.85	14.27	18.19	27.53
7	3 ×4	8.3	9.96	3.56	3.65	3.74	3.93	4.13	4.33	4.76	......	8.17	11.14	14.61	18.58	28.02
8	3 ×4½	8.9	10.68	4.67	4.77	4.87	5.09	5.31	5.54	6.02	......	8.36	11.37	14.88	18.89	28.41
9	3 ×5	9.5	11.40	5.92	6.03	6.15	6.39	6.64	6.89	7.43	......	8.56	11.61	15.16	19.21	28.81
10	3½×3½	8.3	9.96	2.44	2.51	2.59	2.74	2.90	3.07	3.43	......	......	10.09	13.33	17.07	26.05
11	3½×4	8.9	10.68	3.32	3.40	3.49	3.67	3.85	4.05	4.46	......	......	10.36	13.65	17.44	26.52
12	3½×5	10.2	12.24	5.55	5.66	5.77	6.00	6.24	6.48	6.99	......	......	10.90	14.29	18.18	27.46
13	3½×6	11.4	13.68	8.44	8.58	8.72	9.00	9.29	9.59	10.21	......	......	11.27	14.73	18.69	28.11
14	4 ×4	9.5	11.40	3.13	3.21	3.29	3.46	3.64	3.83	4.22	......	......	....	12.82	16.43	25.15
15	4 ×5	10.8	12.96	5.26	5.36	5.47	5.69	5.91	6.15	6.64	......	......	....	13.48	17.20	26.14
16	4 ×6	13.9	16.68	8.06	8.20	8.33	8.60	8.88	9.17	9.77	......	......	....	13.88	17.67	26.75

FOUR ANGLES ONE PLATE.

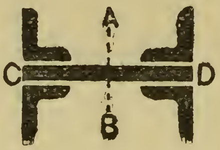


	One Web Plate, Size in Inches.	FOUR ANGLES.		Total Area Square Inches.	AXIS A B.		AXIS C D.	
		Size in Inches.	Lbs. Per Ft.		I	r^2	I	r^2
1	8 × ¼	2½ × 3	4.4	7.28	72.5	9.96	10.3	1.42
2			5.0	8.00	80.3	10.03	12.1	1.51
3			5.8	8.96	90.5	10.10	14.4	1.61
4			6.7	10.04	101.4	10.10	17.3	1.72
5			7.5	11.00	111.1	10.10	19.8	1.80
6			8.3	11.96	119.9	10.03	22.7	1.89
7			9.0	12.80	127.8	9.99	25.1	1.96
8	8 × ⅜	2½ × 3	4.4	8.28	77.9	9.40	11.1	1.34
9			5.0	9.00	85.6	9.51	12.9	1.44
10			5.8	9.96	95.8	9.62	15.4	1.55
11			6.7	11.04	106.7	9.67	18.4	1.67
12			7.5	12.00	116.5	9.71	21.1	1.76
13			8.3	12.96	125.3	9.67	24.1	1.86
14			9.0	13.80	133.2	9.65	26.7	1.94
15	9 × ¼	2½ × 3	4.4	7.53	96.0	12.75	10.3	1.37
16			4.8	8.01	103.0	12.85	11.5	1.43
17			5.6	8.97	116.1	12.94	13.9	1.55
18			6.4	9.93	129.4	13.04	16.3	1.64
19			7.3	11.01	143.6	13.04	19.2	1.75
20			8.1	11.97	156.3	13.05	21.8	1.82
21			9.0	13.05	169.6	13.00	25.1	1.92
22	9 × ⅜	2½ × 3	4.4	8.66	103.6	11.97	11.1	1.28
23			4.7	9.02	108.7	12.06	12.0	1.33
24			5.5	9.98	122.4	12.27	14.4	1.45
25			6.4	11.06	137.0	12.39	17.4	1.58
26			7.2	12.02	149.4	12.44	20.0	1.67
27			8.0	12.98	162.1	12.49	23.0	1.77
28			8.9	14.06	175.5	12.48	26.4	1.88
29			9.0	14.18	177.2	12.50	26.8	1.89

FOUR ANGLES ONE PLATE.

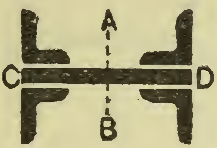


	One Web Plate, Size in Inches.	FOUR ANGLES.		Total Area Square Inches.	AXIS A B.		AXIS C D.	
		Size in Inches.	Lbs. Per Ft.		I	r^2	I	r^2
30	10×¼	2½×3	4.4	7.78	123.2	15.84	10.3	1.33
31			4.6	8.02	127.4	15.89	11.0	1.37
32			5.4	8.98	145.0	16.14	13.2	1.47
33			6.2	9.94	162.1	16.31	15.6	1.57
34			7.1	11.02	180.5	16.38	18.5	1.68
35			7.9	11.98	196.1	16.37	21.3	1.78
36			8.7	12.94	212.2	16.40	24.0	1.85
37			9.0	13.30	217.9	16.38	25.1	1.89
38	10×⅜	2½×3	4.4	9.03	133.7	14.80	11.1	1.23
39			5.2	9.99	151.3	15.14	13.5	1.35
40			6.0	10.95	168.0	15.34	16.1	1.47
41			6.9	12.03	186.4	15.50	19.2	1.59
42			7.7	12.99	202.9	15.62	21.9	1.69
43			8.5	13.95	219.1	15.70	24.7	1.77
44			9.0	14.55	228.3	15.69	26.8	1.84
45	12×¼	2½×3	4.4	8.28	189.5	22.89	10.4	1.25
46			5.0	9.00	209.3	23.25	12.1	1.34
47			5.8	9.96	235.5	23.65	14.4	1.45
48			6.7	11.04	264.0	23.92	17.3	1.56
49			7.5	12.00	289.5	24.12	19.8	1.65
50			8.3	12.96	313.4	24.18	22.6	1.75
51			9.0	13.80	334.6	24.24	25.1	1.82
52	12×⅜	2½×3	4.4	9.78	207.5	21.22	11.1	1.13
53			4.6	10.02	213.9	21.35	11.7	1.17
54			5.4	10.98	240.5	21.90	14.2	1.29
55			6.2	11.94	266.6	22.32	16.7	1.40
56			7.1	13.02	294.8	22.64	19.8	1.52
57			7.9	13.98	319.0	22.82	22.7	1.63
58			8.7	14.94	343.7	23.01	25.6	1.71
59			9.0	15.30	352.6	23.04	26.8	1.75

FOUR ANGLES  ONE PLATE.

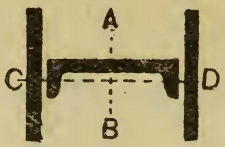
	One Web Plate, Size in Inches.	FOUR ANGLES.		Total Area Square Inches.	AXIS A B.		AXIS C D.	
		Size in Inches.	Lbs. Per Ft.		I	r^2	I	r^2
60	14×¼	2½×3	4.4	8.78	272.4	31.02	10.4	1.18
61			4.6	9.02	281.5	31.21	11.0	1.22
62			5.4	9.98	318.9	31.96	13.2	1.33
63			6.2	10.94	355.9	32.53	15.6	1.43
64			7.1	12.02	396.1	32.95	18.5	1.54
65			7.9	12.98	430.8	33.18	21.3	1.64
66			8.7	13.94	466.1	33.44	24.0	1.72
67			9.0	14.30	478.9	33.49	25.1	1.75
68	14×⅜	2½×3	4.4	10.53	300.9	28.58	11.1	1.05
69			4.8	11.01	319.8	29.05	12.3	1.12
70			5.6	11.97	356.3	29.77	14.9	1.24
71			6.4	12.93	393.1	30.40	17.4	1.35
72			7.3	14.01	433.2	30.92	20.5	1.47
73			8.1	14.97	468.8	31.32	23.3	1.56
74			9.0	16.05	507.5	31.62	26.8	1.67
75	15×¼	2½×3	4.4	9.03	320.3	35.47	10.4	1.15
76			5.2	9.99	364.1	36.45	12.6	1.26
77			6.0	10.95	406.5	37.12	15.1	1.38
78			6.9	12.03	453.6	37.71	18.0	1.49
79			7.7	12.99	495.6	38.15	20.5	1.58
80			8.5	13.95	537.1	38.50	23.2	1.66
81			9.0	14.55	561.7	38.61	25.1	1.72
82	15×⅜	2½×3	4.4	10.91	355.5	32.60	11.1	1.02
83			4.5	11.03	361.2	32.76	11.4	1.03
84			5.3	11.99	404.1	33.72	13.9	1.16
85			6.1	12.95	447.2	34.55	16.4	1.27
86			7.0	14.03	494.4	35.25	19.5	1.39
87			7.8	14.99	536.3	35.79	22.2	1.48
88			8.6	15.95	576.4	36.14	25.3	1.59
89			9.0	16.43	596.9	36.34	26.8	1.63

FOUR ANGLES ONE PLATE.



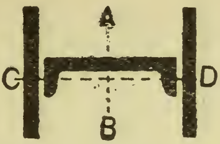
	One Web Plate, Size in Inches.	FOUR ANGLES.		Total Area Square Inches.	AXIS A B.		AXIS C D.	
		Size in Inches.	Lbs. Per Ft.		I	r^2	I	r^2
90	16×¼	2½×3	4.4	9.28	372.8	40.17	10.4	1.12
91			5.0	10.00	410.3	41.03	12.1	1.21
92			5.8	10.96	460.3	42.00	14.4	1.32
93			6.7	12.04	515.0	42.77	17.3	1.44
94			7.5	13.00	563.7	43.36	19.8	1.52
95			8.3	13.96	610.5	43.74	22.7	1.62
96			9.0	14.80	651.7	44.04	25.1	1.70
97	16×⅜	2½×3	4.4	11.28	415.5	36.83	11.1	0.98
98			5.0	12.00	452.9	37.75	13.0	1.08
99			5.8	12.96	502.9	38.81	15.4	1.19
100			6.7	14.04	557.7	39.72	18.5	1.32
101			7.5	15.00	606.4	40.43	21.1	1.41
102			8.3	15.96	653.2	40.93	24.2	1.51
103			9.0	16.80	694.4	41.33	26.8	1.59
104	17×¼	2½×3	4.4	9.53	429.9	45.10	10.4	1.09
105			4.8	10.01	458.7	45.83	11.5	1.15
106			5.6	10.97	515.0	46.95	13.9	1.27
107			6.4	11.93	571.7	47.92	16.3	1.37
108			7.3	13.01	633.7	48.71	19.2	1.48
109			8.1	13.97	689.0	49.32	21.8	1.56
110			9.0	15.05	749.3	49.79	25.1	1.67
111	17×⅜	2½×3	4.4	11.66	481.0	41.27	11.1	0.95
112			4.8	12.14	509.9	42.02	12.3	1.01
113			5.6	13.10	566.2	43.24	14.9	1.14
114			6.4	14.06	623.0	44.32	17.4	1.24
115			7.3	15.14	684.9	45.26	20.5	1.36
116			8.1	16.10	740.2	45.99	23.3	1.45
117			9.0	17.18	800.4	46.61	26.8	1.56

TWO PLATES. ONE CHANNEL.



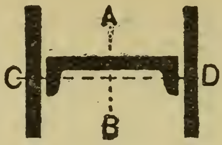
	Two Plates. Size in Inches.	ONE CHANNEL.		Total Area, Square Inches.	AXIS A B.		AXIS C D.	
		Size in Inches.	Lbs. Per Foot.		I	r^2	I	r^2
1	3×¼	3	5.0	3.00	6.00	2.00	1.44	0.48
2		4	5.0	3.00	10.48	3.49	1.45	0.48
3		5	6.5	3.45	17.34	5.03	1.57	0.45
4	3×5/16	3	5.0	3.38	7.18	2.13	1.72	0.51
5		4	5.0	3.38	12.43	3.68	1.73	0.51
6		5	6.5	3.83	20.23	5.29	1.85	0.48
7	3×3/8	3	5.0	3.75	8.45	2.25	2.00	0.53
8		4	5.0	3.75	14.48	3.86	2.01	0.54
9		5	6.5	4.20	23.26	5.54	2.13	0.51
10	3×7/16	3	5.0	4.13	9.80	2.38	2.28	0.55
11		4	5.0	4.13	16.64	4.03	2.29	0.56
12		5	6.5	4.58	26.41	5.77	2.41	0.53
13	3×½	3	5.0	4.50	11.23	2.50	2.56	0.57
14		4	5.0	4.50	18.90	4.20	2.57	0.57
15		5	6.5	4.95	29.69	6.00	2.69	0.54
16	4×¼	3	5.0	3.50	7.32	2.09	2.98	0.85
17		4	5.0	3.50	12.74	3.64	2.99	0.85
18		5	6.5	3.95	20.78	5.26	3.11	0.79
19		6	7.5	4.25	31.63	7.44	3.26	0.77
20	4×5/16	3	5.0	4.00	8.90	2.22	3.65	0.91
21		4	5.0	4.00	15.33	3.83	3.65	0.91
22		5	6.5	4.45	24.64	5.54	3.77	0.85
23		6	7.5	4.75	37.00	7.79	3.93	0.83
24	4×3/8	3	5.0	4.50	10.59	2.35	4.31	0.96
25		4	5.0	4.50	18.07	4.02	4.32	0.96
26		5	6.5	4.95	28.68	5.79	4.44	0.90
27		6	7.5	5.25	42.59	8.11	4.60	0.88
28	4×7/16	3	5.0	5.00	12.38	2.48	4.98	1.00
29		4	5.0	5.00	20.94	4.19	4.99	1.00
30		5	6.5	5.45	32.87	6.03	5.11	0.94
31		6	7.5	5.75	48.37	8.41	5.26	0.92

TWO PLATES. ONE CHANNEL.



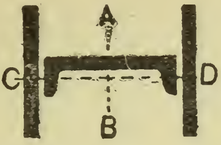
	Two Plates. Size in Inches.	ONE CHANNEL.		Total Area, Square Inches.	AXIS A B.		AXIS C D.	
		Size in Inches.	Lbs. Per Foot.		I	r^2	I	r^2
32	$4\times\frac{1}{2}$	3	5.0	5.50	14.29	2.60	5.65	1.03
33		4	5.0	5.50	23.96	4.36	5.65	1.03
34		5	6.5	5.95	37.25	6.26	5.77	0.97
35		6	7.5	6.25	54.35	8.70	5.93	0.95
36	$5\times\frac{1}{4}$	4	5.0	4.00	15.00	3.75	5.53	1.38
37		5	6.5	4.45	24.23	5.44	5.65	1.27
38		6	7.5	4.75	36.52	7.69	5.80	1.22
39		7	8.5	5.05	51.35	10.17	5.89	1.17
40	$5\times\frac{5}{16}$	4	5.0	4.63	18.24	3.94	6.83	1.48
41		5	6.5	5.08	29.05	5.72	6.95	1.37
42		6	7.5	5.38	43.23	8.04	7.11	1.32
43		7	8.5	5.68	60.25	10.62	7.19	1.27
44	$5\times\frac{3}{8}$	4	5.0	5.25	21.66	4.13	8.13	1.55
45		5	6.5	5.70	34.10	5.98	8.25	1.45
46		6	7.5	6.00	50.22	8.37	8.41	1.40
47		7	8.5	6.30	69.50	11.03	8.49	1.35
48	$5\times\frac{7}{16}$	4	5.0	5.88	25.25	4.30	9.44	1.61
49		5	6.5	6.33	39.34	6.22	9.56	1.51
50		6	7.5	6.63	57.43	8.67	9.71	1.47
51		7	8.5	6.93	79.02	11.41	9.80	1.41
52	$5\times\frac{1}{2}$	4	5.0	6.50	29.02	4.46	10.74	1.65
53		5	6.5	6.95	44.81	6.45	10.86	1.56
54		6	7.5	7.25	64.91	8.95	11.01	1.52
55		7	8.5	7.55	88.81	11.76	11.10	1.47
56	$5\times\frac{9}{16}$	4	5.0	7.13	32.98	4.63	12.04	1.69
57		5	6.5	7.58	50.51	6.67	12.16	1.61
58		6	7.5	7.88	72.66	9.23	12.31	1.56
59		7	8.5	8.18	98.92	12.10	12.40	1.52
60	$5\times\frac{5}{8}$	4	5.0	7.75	37.13	4.79	13.34	1.72
61		5	6.5	8.20	56.42	6.88	13.46	1.64
62		6	7.5	8.50	80.66	9.49	13.62	1.60
63		7	8.5	8.80	109.32	12.42	13.70	1.56

TWO PLATES. ONE CHANNEL.



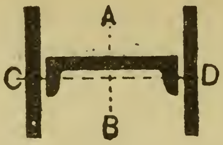
	Two Plates. Size in Inches.	ONE CHANNEL.		Total Area, Square Inches.	AXIS A B.		AXIS C D.	
		Size in Inches.	Lbs. Per Foot.		I	r^2	I	r^2
64	5×11/16	4	5.0	8.38	41.48	4.95	14.64	1.75
65		5	6.5	8.83	62.60	7.09	14.76	1.67
66		6	7.5	9.13	88.98	9.75	14.92	1.63
67		7	8.5	9.43	120.08	12.74	15.00	1.59
68	5×¾	4	5.0	9.00	46.02	5.11	15.95	1.77
69		5	6.5	9.45	68.99	7.30	16.07	1.70
70		6	7.5	9.75	97.53	10.00	16.22	1.66
71		7	8.5	10.05	131.10	13.04	16.31	1.62
72	6×¼	4	5.0	4.50	17.26	3.84	9.32	2.07
73		5	6.5	4.95	27.67	5.59	9.44	1.91
74		6	7.5	5.25	41.40	7.88	9.60	1.83
75		7	8.5	5.55	57.92	10.44	9.68	1.74
76		8	10.0	6.00	78.65	13.11	9.88	1.65
77	6×5/16	4	5.0	5.25	21.14	4.03	11.57	2.20
78		5	6.5	5.70	33.46	5.87	11.69	2.05
79		6	7.5	6.00	49.45	8.24	11.85	1.97
80		7	8.5	6.30	68.63	10.80	11.93	1.89
81		8	10.0	6.75	92.38	13.68	12.13	1.80
82	6×⅜	4	5.0	6.00	25.25	4.21	13.82	2.30
83		5	6.5	6.45	39.51	6.13	13.94	2.16
84		6	7.5	6.75	57.81	8.57	14.10	2.09
85		7	8.5	7.05	79.71	11.31	14.18	2.01
86		8	10.0	7.50	106.53	14.20	14.38	1.92
87	6×7/16	4	5.0	6.75	29.56	4.38	16.07	2.38
88		5	6.5	7.20	45.81	6.36	16.19	2.25
89		6	7.5	7.50	66.50	8.87	16.35	2.18
90		7	8.5	7.80	91.12	11.63	16.43	2.11
91		8	10.0	8.25	121.01	14.67	16.63	2.02
92	6×½	4	5.0	7.50	34.08	4.54	18.32	2.44
93		5	6.5	7.95	52.37	6.59	18.44	2.32
94		6	7.5	8.25	75.47	9.15	18.60	2.25
95		7	8.5	8.55	102.87	12.03	18.68	2.19
96		8	10.0	9.00	135.95	15.11	18.88	2.10

TWO PLATES. ONE CHANNEL.



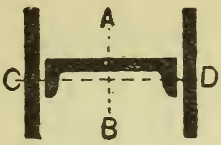
	Two Plates, Size in Inches.	ONE CHANNEL.		Total Area, Square Inches.	AXIS A B.		AXIS C D.	
		Size in Inches.	Lbs. Per Foot.		I	r^2	I	r^2
97	$6\times\frac{9}{16}$	4	5.0	8.25	38.83	4.71	20.57	2.49
98		5	6.5	8.70	59.20	6.81	20.69	2.38
99		6	7.5	9.00	84.77	9.42	20.85	2.32
100		7	8.5	9.30	115.00	12.37	20.93	2.25
101		8	10.0	9.75	151.30	15.52	21.13	2.17
102	$6\times\frac{5}{8}$	4	5.0	9.00	43.80	4.87	22.82	2.54
103		5	6.5	9.45	66.31	7.02	22.94	2.43
104		6	7.5	9.75	94.37	9.68	23.10	2.37
105		7	8.5	10.05	127.48	12.68	23.18	2.31
106		8	10.0	10.50	167.04	15.91	23.38	2.23
107	$6\times\frac{11}{16}$	4	5.0	9.75	49.04	5.03	25.07	2.57
108		5	6.5	10.20	73.72	7.23	25.19	2.47
109		6	7.5	10.50	104.36	9.94	25.35	2.41
110		7	8.5	10.80	140.40	13.00	25.43	2.35
111		8	10.0	11.25	183.28	16.29	25.63	2.28
112	$6\times\frac{3}{4}$	4	5.0	10.50	54.48	5.19	27.32	2.60
113		5	6.5	10.95	81.38	7.43	27.44	2.51
114		6	7.5	11.25	114.62	10.19	27.60	2.45
115		7	8.5	11.55	153.64	13.30	27.68	2.40
116		8	10.0	12.00	199.85	16.65	27.88	2.32
117	$7\times\frac{1}{4}$	5	6.5	5.45	31.12	5.71	14.73	2.70
118		6	7.5	5.75	46.28	8.05	14.89	2.59
119		7	8.5	6.05	64.49	10.66	14.97	2.47
120		8	10.0	6.50	87.16	13.41	15.17	2.33
121		9	14.5	7.85	122.27	15.57	16.36	2.08
122	$7\times\frac{5}{16}$	5	6.5	6.33	37.86	5.98	18.33	2.90
123		6	7.5	6.63	55.68	8.40	18.48	2.79
124		7	8.5	6.93	76.98	11.11	18.57	2.68
125		8	10.0	7.38	103.17	13.98	18.76	2.54
126		9	14.5	8.73	142.24	16.30	19.95	2.29
127	$7\times\frac{3}{8}$	5	6.5	7.20	44.93	6.24	21.88	3.04
128		6	7.5	7.50	65.46	8.73	22.03	2.94
129		7	8.5	7.80	89.91	11.53	22.12	2.84
130		8	10.0	8.25	119.68	14.51	22.32	2.71
131		9	14.5	9.60	162.78	16.96	23.50	2.45

TWO PLATES. ONE CHANNEL.



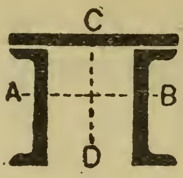
	Two Plates, Size in Inches.	ONE CHANNEL.		Total Area, Square Inches.	AXIS A B.		AXIS C D.	
		Size in Inches.	Lbs. Per Foot.		I	r^2	I	r^2
132	$7\times\frac{7}{16}$	5	6.5	8.08	52.28	6.47	25.45	3.15
133		6	7.5	8.38	75.56	9.02	25.61	3.06
134		7	8.5	8.68	103.22	11.89	25.69	2.96
135		8	10.0	9.13	136.62	14.96	25.89	2.84
136		9	14.5	10.48	183.80	17.54	27.08	2.58
137	$7\times\frac{1}{2}$	5	6.5	8.95	59.93	6.70	29.03	3.24
138		6	7.5	9.25	86.04	9.30	29.18	3.15
139		7	8.5	9.55	116.94	12.25	29.27	3.06
140		8	10.0	10.00	154.03	15.40	29.46	2.95
141		9	14.5	11.35	205.34	18.09	30.65	2.70
142	$7\times\frac{9}{16}$	5	6.5	9.83	67.90	6.91	32.60	3.32
143		6	7.5	10.13	96.88	9.56	32.75	3.23
144		7	8.5	10 43	131.08	12.57	32.84	3.15
145		8	10.0	10 88	171.92	15.80	33 03	3.04
146		9	14.5	12.23	227.42	18.60	34.22	2.80
147	$7\times\frac{5}{8}$	5	6 5	10.70	76.21	7.12	36.17	3.38
148		6	7.5	11.00	108.11	9.83	36.33	3.30
149		7	8.5	11 30	145.68	12.89	36.41	3.22
150		8	10.0	11.75	190.31	16.20	36.61	3.12
151		9	14.5	13.10	250.05	19.09	37.80	2.89
152	$7\times\frac{11}{16}$	5	6.5	11.58	84.85	7.33	39.74	3.43
153		6	7 5	11 88	119.72	10 08	39.90	3.36
154		7	8 5	12.18	160.71	13.20	39.98	3.28
155		8	10.0	12.63	209.21	16.57	40.18	3.18
156		9	14.5	13.98	273 23	19.55	41.37	2 96
157	$7\times\frac{3}{4}$	5	6 5	12.45	93.79	7.53	43.32	3.48
158		6	7.5	12.75	131.70	10.33	43.47	3.41
159		7	8.5	13.05	176 17	13.50	43.56	3.34
160		8	10.0	13.50	228.58	16.93	43.76	3.24
161		9	14.5	14.85	296 94	20.00	44.94	3.03
162	$8\times\frac{3}{8}$	6	7.5	8.25	73.06	8.86	32.60	3.95
163		7	8.5	8.55	100.09	11.71	32.68	3.82
164		8	10.0	9.00	132 81	14.76	32.88	3.65
165		9	14.5	10.35	179.23	17.32	34.07	3.29
166		10	16.0	10.80	223.96	20.74	34.18	3.17

TWO PLATES. ONE CHANNEL.



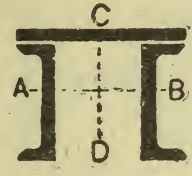
	Two Plates, Size in Inches.	ONE CHANNEL.		Total Area, Square Inches.	AXIS A B.		AXIS C D.	
		Size in Inches.	Lbs. Per Foot.		I	r^2	I	r^2
167	8×$\frac{7}{16}$	6	7 5	9.25	84.64	9.15	37.93	4 10
168		7	8.5	9.55	115.32	12.08	38.02	3.98
169		8	10 0	10 00	152.20	15.22	38 21	3.82
170		9	14.5	11.35	203.23	17.91	39.40	3.47
171		10	16 0	11.80	253.17	21.45	39.52	3.35
172	8×½	6	7 5	10.25	96.60	9 42	43.26	4.22
173		7	8.5	10 55	130 99	12.42	43 35	4.11
174		8	10 0	11.00	172.09	15.64	43.55	3.96
175		9	14 5	12.35	227.89	18 45	44.73	3.62
176		10	16.0	12.80	283.00	22 11	44 85	3.50
177	8×$\frac{9}{16}$	6	7.5	11 25	109.00	9 69	48.60	4.32
178		7	8 5	11.55	147.16	12.74	48.68	4 21
179		8	10.0	12.00	192.55	16 05	48 88	4.07
180		9	14.5	13.35	253 12	18 96	50 07	3.75
181		10	16.0	13.80	313.50	22 72	50.18	3.64
182	8×⅝	6	7.5	12 25	121.83	9.95	53.93	4 40
183		7	8.5	12.55	163 86	13.06	54.01	4.30
184		8	10.0	13.00	213.59	16.43	54.21	4.17
185		9	14.5	14 35	279.00	19.44	55.40	3 86
186		10	16.0	14 80	344 72	23.29	55.52	3 75
187	8×$\frac{11}{16}$	6	7 5	13 25	135.10	10.20	59.26	4.47
188		7	8 5	13.55	181.04	13 36	59.35	4.38
189		8	10.0	14 00	235.18	16 80	59.55	4.25
190		9	14.5	15 35	305.50	19.90	60 73	3 96
191		10	16.0	15.80	376.65	23.84	60.85	3.85
192	8×¾	6	7.5	14.25	148.80	10.44	64.60	4.53
193		7	8.5	14.55	198.70	13.66	64.68	4.45
194		8	10.0	15 00	257.30	17.15	64.88	4.33
195		9	14 5	16 35	332.60	20 34	66.07	4.04
196		10	16.0	16.80	409.20	24 36	66.18	3.94

TWO CHANNELS. ONE PLATE.



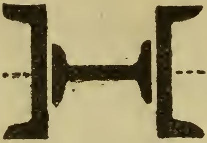
	TWO CHANNELS.		Top Plate, Size in Inches.	Total Area, Square Inches.	Eccentricity.	AXIS A B.		AXIS C D
	Depth in Inches.	Lbs. Per Foot.				I	r²	I
1	5	6.5	10×¼	6.40	1.03	24.4	3.82	77.4
2		8.5		7.60	0.86	28.1	3.69	90.3
3		9.0		7.90	0.83	32.2	4.08	95.7
4		14.0		10.90	0.60	40.0	3.67	121.3
5		6.5	12×¼	6.90	1.14	25.7	3.73	126.0
6		8.5		8.10	0.97	29.5	3.64	147.9
7		9.0		8.40	0.94	33.7	4.01	156.0
8		14.0		11.40	0.69	41.9	3.68	202.2
9	6	7.5	10×¼	7.00	1.12	39.8	5.69	84.3
10		9.5		8.20	0.95	44.8	5.46	96.6
11		10.0		8.50	0.92	50.4	5.91	101.5
12		16.0		12.10	0.65	63.4	5.24	131.2
13		7.5	12×¼	7.50	1.25	41.8	5.57	137.4
14		9.5		8.70	1.08	47.0	5.40	158.6
15		10.0		9.00	1.04	52.8	5.86	166.1
16		16.0		12.60	0.74	66.3	5.26	220.1
17	7	8.5	10×¼	7.60	1.19	59.1	7.77	87.7
18		10.5		8.80	1.03	68.3	7.76	100.9
19		14.0		10.90	0.83	86.5	7.94	119.2
20		20.0		14.50	0.63	103.0	7.10	143.4
21		8.5	12×¼	8.10	1.34	61.9	7.64	144.5
22		10.5		9.30	1.17	71.5	7.69	166.7
23		14.0		11.40	0.95	90.3	7.92	199.2
24		20.0		15.00	0.73	107.3	7.16	245.8
25	8	10.0	12×¼	9.00	1.38	89.1	9.90	159.3
26		12.5		10.50	1.18	105.4	10.04	191.6
27		16.0		12.60	0.98	129.5	10.28	222.6
28		28.0		19.80	0.63	172.3	8.70	309.5
29		10.0	14×¼	9.50	1.52	92.8	9.77	240.4
30		12.5		11.00	1.31	109.7	9.97	288.0
31		16.0		13.10	1.10	134.3	10.25	337.0
32		28.0		20.30	0.71	178.3	8.78	481.2

TWO CHANNELS. ONE PLATE.

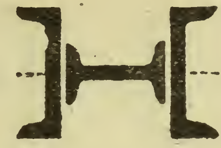


	TWO CHANNELS.		Top Plate, Size in Inches.	Total Area, Square Inches.	Eccentricity.	AXIS A B.		AXIS C D.
	Depth in Inches.	Lbs. Per Foot.				I	r^2	I
33	9	14.5	12×¼	11.70	1.19	142.4	12.17	185.0
34		16.0		12.60	1.10	161.5	12.82	209.6
35		18.0		13.80	1.01	179.7	13.02	236.1
36		30.0		21.00	0.66	224.2	10.68	303.9
37		14.5	14×¼	12.20	1.33	148.1	12.14	285.8
38		16.0		13.10	1.24	167.5	12.78	321.0
39		18.0		14.30	1.13	186.2	13.02	359.9
40		30.0		21.50	0.75	231.9	10.78	480.0
41	10	16.0	14×¼	13.10	1.37	192.3	14.68	304.4
42		17.5		14.00	1.28	220.0	15.71	346.0
43		20.0		15.50	1.16	249.9	16.12	380.4
44		35.0	14×⅜	26.25	1.04	366.8	13.97	551.8
45		16.0	16×¼	13.60	1.51	199.0	14.64	438.8
46		17.5		14.50	1.41	227.2	15.67	493.8
47		20.0		16.00	1.28	257.6	16.10	544.0
48		35.0	16×⅜	27.00	1.15	379.4	14.05	809.9
49	12	20.0	16×5/16	17.00	1.81	371.8	21.87	502.6
50		22.5		18.50	1.66	418.3	22.61	559.6
51		30.0		23.00	1.34	500.3	21.75	766.6
52		50.0		35.00	0.88	658.4	18.81	1071.1
53		20.0	18×⅜	18.75	2.23	403.2	21.50	726.5
54		22.5		20.25	2.06	452.5	22.35	803.4
55		30.0		24.75	1.69	539.7	21.81	1076.5
56		50.0		36.75	1.14	706.9	19.23	1513.8
57	12	20.0	16×⅜	18.00	2.06	391.3	21.74	523.9
58		22.5		19.50	1.90	439.3	22.53	580.9
59		30.0		24.00	1.55	524.1	21.84	787.9
60		50.0		36.00	1.03	687.5	19.10	1092.4
61		20.0	18×7/16	19.88	2.46	422.3	21.25	756.9
62		22.5		21.38	2.29	472.5	22.11	833.8
63		30.0		25.88	1.89	564.2	21.81	1106.7
64		50.0		37.88	1.29	737.6	19.47	1544.4

TWO CHANNELS --- ONE I BEAM

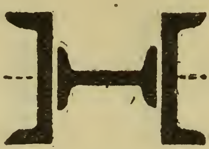


	TWO CHANNELS.			ONE I BEAM.			Total Area, Square Inches.	I	r²
	Depth in In.	Lbs. Per Foot.	Area in Sq. In.	Depth in In.	Lbs. Per Foot.	Area in Sq. In.			
1	4	5.0	3.00	3	7.0	2.10	**5.10**	7.97	**1.56**
2				4	8.0	2 40	**5.40**	8 13	**1.51**
3				5	10.0	3.00	**6.00**	8.50	**1.42**
4				6	13.5	4.05	**7.05**	9.42	**1.34**
5	4	7.0	4 20	3	7 0	2 10	**6.30**	10.51	**1.67**
6				4	8 0	2.40	**6.60**	10.67	**1.62**
7				5	10.0	3 00	**7,20**	11.04	**1.53**
8				6	13 5	4.05	**8.25**	11.96	**1.45**
9	4	9.0	5.40	3	7.0	2.10	**7.50**	12.11	**1.62**
10				4	8 0	2.40	**7.80**	12.27	**1.57**
11				5	10 0	3.00	**8.40**	12.64	**1.51**
12				6	13.5	4.05	**9.45**	13.56	**1.44**
13	5	6.5	3.90	4	8,0	2 40	**6.30**	14.71	**2.34**
14				5	10 0	3 00	**6.90**	15 08	**2.19**
15				6	13 5	4.05	**7.95**	16.00	**2.01**
16				7	18.0	5.40	**9.30**	17.72	**1.91**
17	5	9.0	5.40	4	8 0	2.40	**7.80**	21.15	**2.71**
18				5	10.0	3.00	**8.40**	21 52	**2.56**
19				6	13 5	4.05	**9.45**	22.44	**2.38**
20				7	18.0	5.40	**10.80**	24.16	**2.24**
21	5	14.0	8.40	4	8.0	2 40	**10.80**	27.41	**2 54**
22				5	10 0	3.00	**11.40**	27.78	**2.44**
23				6	13.5	4.05	**12.45**	28.70	**2.31**
24				7	18.0	5 40	**13.80**	30.42	**2.20**
25	6	7.5	4.50	4	8.0	2.40	**6.90**	24 91	**3.61**
26				5	10.0	3 00	**7.50**	25.28	**3.37**
27				6	13.5	4.05	**8.55**	26.20	**3.06**
28				7	18.0	5 40	**9 90**	27.92	**2.82**
29				8	22.0	6.60	**11.10**	28 77	**2.59**

TWO CHANNELS ---  --- ONE I BEAM.

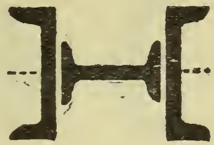
	TWO CHANNELS.			ONE I BEAM.			Total Area, Square Inches.	I	r^2
	Depth in In.	Lbs. Per Foot.	Area in Sq. In.	Depth in In.	Lbs. Per Foot.	Area in Sq. In.			
30	6	10.0	6.00	4	8.0	2.40	8.40	33.91	4.04
31				5	10.0	3.00	9.00	34.28	3.81
32				6	13.5	4.05	10.05	35.20	3.50
33				7	18.0	5.40	11.40	36.92	3.24
34				8	22.0	6.60	12.60	37.77	3.00
35	6	16.0	9.60	4	8.0	2.40	12.00	44.71	3.73
36				5	10.0	3.00	12.60	45.08	3.58
37				6	13.5	4.05	13.65	46.00	3.37
38				7	18.0	5.40	15.00	47.72	3.18
39				8	22.0	6.60	16.20	48.57	3.00
40	7	8.5	5.10	5	10.0	3.00	8.10	38.08	4.70
41				6	13.5	4.05	9.15	39.00	4.26
42				7	18.0	5.40	10.50	40.72	3.88
43				8	22.0	6.60	11.70	41.57	3.55
44				9	23.5	7.05	12.15	42.48	3.50
45	7	10.5	6.30	5	10.0	3.00	9.30	45.88	4.93
46				6	13.5	4.05	10.35	46.80	4.52
47				7	18.0	5.40	11.70	48.52	4.15
48				8	22.0	6.60	12.90	49.37	3.83
49				9	23.5	7.05	13.35	50.28	3.77
50	7	13.5	8.10	5	10.0	3.00	11.10	53.28	4.80
51				6	13.5	4.05	12.15	54.20	4.46
52				7	18.0	5.40	13.50	55.92	4.14
53				8	22.0	6.60	14.70	56.77	3.86
54				9	23.5	7.05	15.15	57.68	3.81
55	7	20.0	12.00	5	10.0	3.00	15.00	76.88	5.13
56				6	13.5	4.05	16.05	77.80	4.85
57				7	18.0	5.40	17.40	79.52	4.57
58				8	22.0	6.60	18.60	80.37	4.32
59				9	23.5	7.05	19.05	81.28	4.27

TWO CHANNELS ---



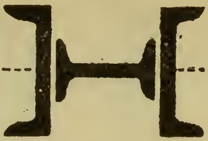
--- ONE I BEAM.

	TWO CHANNELS.			ONE I BEAM.			Total Area, Square Inches.	I	r^2
	Depth in In.	Lbs. Per Foot.	Area in Sq. In.	Depth in In.	Lbs. Per Foot.	Area in Sq. In.			
60	8	10.0	6.00	6	13 5	4 05	10.05	57.20	5.69
61				7	18.0	5 40	11.40	58.92	5.17
62				8	22 0	6.60	12 60	59.77	4.74
63				9	23 5	7.05	13 05	60.68	4 65
64				10	30.0	9 00	15 00	63.14	4.21
65	8	12.5	7.50	6	13 5	4 05	11 55	71 00	6 15
66				7	18 0	5.40	12 90	72 72	5.64
67				8	22.0	6.60	14 10	73 57	5.22
68				9	23 5	7 05	14 55	74 48	5 12
69				10	30.0	9.00	16.50	76.94	4.66
70	8	15.5	9 30	6	13 5	4 05	13 35	80 40	6.02
71				7	18 0	5 40	14.70	82 12	5 59
72				8	22 0	6 60	15 90	82 97	5 22
73				9	23 5	7 05	16 35	83.88	5 13
74				10	30.0	9 00	18.30	86.34	4.72
75	8	28.0	16.80	6	13 5	4 05	20 85	131 00	6.28
76				7	18.0	5 40	22 20	132 72	5 98
77				8	22.0	6.60	23 40	133 57	5 71
78				9	23 5	7.05	23.85	134 48	5.61
79				10	30.0	9.00	25.80	136.94	5 31
80	9	14.5	8.70	6	13.5	4.05	12.75	96.80	7.59
81				7	18.0	5 40	14.10	98 52	6.99
82				8	22.0	6 60	15.30	99.37	6.50
83				9	23 5	7 05	15.75	100.28	6 37
84				10	30.0	9.00	17.70	102.74	5 80
85	9	16.0	9.60	6	13 5	4 05	13.65	114.60	8 40
86				7	18.0	5.40	15 00	116.32	7 76
87				8	22.0	6 60	16.20	117.17	7.23
88				9	23.5	7.05	16.65	118.08	7 09
89				10	30.0	9 00	18.60	120.54	6.48

TWO CHANNELS  ONE I BEAM.

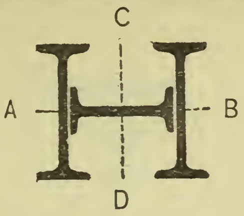
	TWO CHANNELS.			ONE I BEAM.			Total Area, Square Inches.	I	r²
	Depth in In.	Lbs. Per Foot.	Area in Sq In	Depth in In.	Lbs Per Foot.	Area in Sq In			
90	9	30.0	18.00	6	13.5	4.05	22.05	180.20	8.17
91				7	18.0	5.40	23.40	181.92	7.77
92				8	22.0	6.60	24.60	182.77	7.43
93				9	23.5	7.05	25.05	183.68	7.33
94				10	30.0	9.00	27.00	186.14	6.89
95	10	17.5	10.50	6	13.5	4.05	14.55	153.00	10.52
96				7	18.0	5.40	15.90	154.72	9.73
97				8	22.0	6.60	17.10	155.57	9.10
98				9	23.5	7.05	17.55	156.48	8.92
99				10	30.0	9.00	19.50	158.94	8.15
100	10	20.0	12.00	6	13.5	4.05	16.05	180.80	11.26
101				7	18.0	5.40	17.40	182.52	10.49
102				8	22.0	6.60	18.60	183.37	9.86
103				9	23.5	7.05	19.05	184.28	9.67
104				10	30.0	9.00	21.00	186.74	8.89
105	10	35.0	21.00	6	13.5	4.05	25.05	255.80	10.21
106				7	18.0	5.40	26.40	257.52	9.75
107				8	22.0	6.60	27.60	258.37	9.36
108				9	23.5	7.05	28.05	259.28	9.24
109				10	30.0	9.00	30.00	261.74	8.74
110	12	22.5	13.50	7	18.0	5.40	18.90	283.72	15.01
111				8	22.0	6.60	20.10	284.57	14.16
112				9	23.5	7.05	20.55	285.48	13.89
113				10	30.0	9.00	22.50	287.94	12.80
114				12	42.0	12.60	26.10	291.00	11.15
115	12	30.0	18.00	7	18.0	5.40	23.40	339.72	14.52
116				8	22.0	6.60	24.60	340.57	13.84
117				9	23.5	7.05	25.05	341.48	13.63
118				10	30.0	9.00	27.00	343.94	12.74
119				12	42.0	12.60	30.60	347.00	11.34

TWO CHANNELS --- ONE I BEAM.



	TWO CHANNELS.			ONE I BEAM.			Total Area, Square Inches.	I	r²
	Depth in In.	Lbs. Per Foot.	Area in Sq. In.	Depth in In.	Lbs. Per Foot.	Area in Sq. In.			
120	12	50.0	30.00	7	18.0	5.40	**35.40**	499.72	**14.12**
121				8	22.0	6.60	**36.60**	500.57	**13.68**
122				9	23.5	7.05	**37.05**	501.48	**13.54**
123				10	30.0	9.00	**39.00**	503.94	**12.92**
124				12	42.0	12.60	**42.60**	507.00	**11.90**
125	15	40.0	24.00	8	22.0	6.60	**30.60**	722.57	**23.61**
126				9	23.5	7.05	**31.05**	723.48	**23.30**
127				10	30.0	9.00	**33.00**	725.94	**22.00**
128				12	42.0	12.60	**36.60**	729.00	**19.92**
129				15	50.0	15.00	**39.00**	734.30	**18.83**
130	15	50.0	30.00	8	22.0	6.60	**36.60**	834.57	**22.80**
131				9	23.5	7.05	**37.05**	835.48	**22.55**
132				10	30.0	9.00	**39.00**	837.94	**21.48**
133				12	42.0	12.60	**42.60**	841.00	**19.74**
134				15	50.0	15.00	**45.00**	846.30	**18.81**
135	15	60.0	36.00	8	22.0	6.60	**42.60**	946.57	**22.22**
136				9	23.5	7.05	**43.05**	947.48	**22.01**
137				10	30.0	9.00	**45.00**	949.94	**21.11**
138				12	42.0	12.60	**48.60**	953.00	**19.61**
139				15	50.0	15.00	**51.00**	958.30	**18.79**

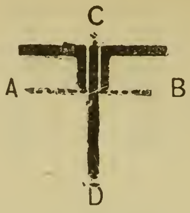
THREE I-BEAMS



	TWO BEAMS.			ONE BEAM.			Total Area, Square Inches.	I	r^2
	Depth in Ins	Lbs. Per Ft.	Area in Sq. Ins.	Depth in Ins.	Lbs. Per Ft.	Area in Sq. Ins.			
1	6	13.5	8.10	6	13.5	4.05	12.15	51.0	4.20
2				7	18.0	5.40	13.50	52.7	3.91
3	7	18.0	10.80	6	13.5	4.05	14.85	93.6	6.30
4				7	18.0	5.40	16.20	95.3	5.88
5				8	22.0	6.60	17.40	96.2	5.53
6				9	23.5	7.05	17.85	97.1	5.44
7	8	22.0	13.20	6	13.5	4.05	17.25	141.8	8.22
8				7	18.0	5.40	18.60	143.5	7.72
9				8	22.0	6.60	19.80	144.4	7.29
10				9	23.5	7.05	20.25	145.3	7.17
11				10	30.0	9.00	22.20	147.7	6.66
12	9	23.5	14.10	7	18.0	5.40	19.50	198.7	10.19
13				8	22.0	6.60	20.70	199.6	9.64
14				9	23.5	7.05	21.15	200.5	9.48
15				10	30.0	9.00	23.10	202.9	8.79
16				12	42.0	12.60	26.70	206.0	7.72
17	10	30.0	18.00	8	22.0	6.60	24.60	304.6	12.38
18				9	23.5	7.05	25.05	305.5	12.19
19				10	30.0	9.00	27.00	307.9	11.41
20				12	42.0	12.60	30.60	311.0	10.16
21				15	50.0	15.00	33.00	316.3	9.58
22	12	42.0	25.20	9	23.5	7.05	32.25	555.5	17.22
23				10	30.0	9.00	34.20	557.9	16.31
24				12	42.0	12.60	37.80	561.0	14.84
25				15	50.0	15.00	40.20	566.3	14.09
26	15	50.0	30.00	9	23.5	7.05	37.05	802.7*	21.67*
27				10	30.0	9.00	39.00	1004,8*	25.76*
28				12	42.0	12.60	42.60	1071.0	25.14
29				15	50.0	15.00	45.00	1076.3	23.92

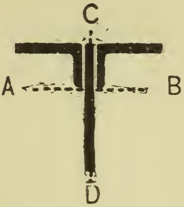
*These values are about Axis C D. All others are about Axis A B.

ONE PLATE. TWO ANGLES.



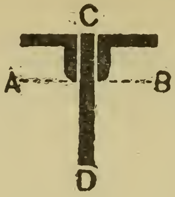
	One Plate, Size in Inches.	TWO ANGLES.		Total Area, Square Inches.	AXIS A B.		Eccentricity.	AXIS C D.
		Size in Inches.	Lbs. Per Foot.		I	r^2		r^2
1	6×¼	2 ×2½	3.5	3.60	10.5	2.93	1.44	0.85
2		2 ×3	4.0	3.90	11.1	2.84	1.55	1.33
3		2½×3	4.4	4.14	11.2	2.71	1.49	1.25
4		3 ×3	5.9	5.04	12.3	2.45	1.50	1.28
5	6×⅜	2 ×2½	3.5	4.35	14.1	3.23	1.19	0.77
6		2 ×3	4.0	4.65	14.9	3.19	1.30	1.19
7		2½×3	4.4	4.89	14.9	3.04	1.26	1.14
8		3 ×3	5.9	5.79	16.1	2.77	1.31	1.20
9	7×¼	2 ×2½	3.5	3.85	16.2	4.22	1.62	0.80
10		2 ×3	4.0	4.15	17.1	4.12	1.74	1.25
11		2½×3	4.4	4.39	17.1	3.90	1.71	1.18
12		3 ×3	5.9	5.29	18.3	3.46	1.77	1.22
13	7×⅜	2 ×2½	3.5	4.73	21.7	4.59	1.32	0.71
14		2 ×3	4.0	5.03	22.9	4.55	1.44	1.10
15		2½×3	4.4	5.27	22.8	4.33	1.42	1.06
16		3 ×3	5.9	6.17	24.2	3.93	1.52	1.13
17	8×¼	2 ×3	4.0	4.40	24.9	5.66	1.92	1.18
18		2½×3	4.4	4.64	24.9	5.36	1.90	1.12
19		3 ×3	5.9	5.54	26.3	4.75	2.01	1.17
20		3 ×4	8.3	6.98	29.3	4.20	2.30	2.55
21	8×⅜	2 ×3	4.0	5.40	33.2	6.15	1.56	1.03
22		2½×3	4.4	5.64	33.2	5.88	1.56	0.99
23		3 ×3	5.9	6.54	35.0	5.35	1.70	1.06
24		3 ×4	8.3	7.98	39.2	4.92	2.01	2.34
25	9×¼	2½×3	4.4	4.89	34.6	7.07	2.07	1.06
26		3 ×3	5.9	5.79	36.4	6.29	2.23	1.12
27		3 ×4	8.3	7.23	40.5	5.60	2.56	2.46
28		3 ×4½	8.9	7.59	41.5	5.47	2.65	3.29

ONE PLATE. TWO ANGLES.



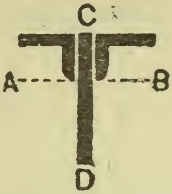
	One Plate, Size in Inches.	TWO ANGLES.		Total Area, Square Inches.	AXIS A B.		Eccen-tricity.	AXIS C D.
		Size in Inches.	Lbs. Per Foot.		I	r^2		r^2
29	9×⅜	2½×3	4.4	6.02	46.1	7.67	1.69	0.93
30		3 ×3	5.9	6.92	48.7	7.04	1.86	1.01
31		3 ×4	8.3	8.36	54.5	6.52	2.22	2.24
32		3 ×4½	8.9	8.72	56.0	6.42	2.30	2.99
33	10×¼	2½×3	4.4	5.14	46.5	9.05	2.23	1.01
34		3 ×3	5.9	6.04	49.0	8.11	2.43	1.07
35		3 ×4	8.3	7 48	54.3	7.26	2.81	2 39
36		3 ×4½	8.9	7.84	55.7	7.10	2 90	3.18
37	10×⅜	2½×3	4.4	6.39	61.9	9.69	1.79	0 87
38		3 ×3	5.9	7.29	65.5	8.98	2.01	0.95
39		3 ×4	8.3	8.73	73.2	8.38	2.41	2 14
40		3 ×4½	8.9	9.09	75.2	8 27	2.50	2.87
41	12×¼	3 ×3	5 9	6.54	81.9	12.53	2.78	0.99
42		3 ×4	8.3	7.98	90.8	11.38	3.26	2.23
43		3 ×5	9.5	8.70	95.3	10 96	3.47	3.88
44		3½×5	10 2	9.12	95.6	10.48	3.45	3.73
45	12×⅜	3 ×3	5.9	8.04	109.4	13.60	2.26	0.87
46		3 ×4	8.3	9.48	122.3	12.90	2.74	1.97
47		3 ×5	9.5	10 20	128.7	12.62	2.96	3.44
48		3½×5	10.2	10.62	128.9	12.14	2.96	3.33
49	$14\times\frac{5}{16}$	3 ×3	5.9	7.92	148.3	18.73	2 75	0.85
50		3 ×4	8.3	9.36	165.4	17.68	3.31	1.95
51		3 ×5	9 5	10.08	173.8	17.25	3.56	3.42
52		3½×5	10.2	10.50	174.0	16.58	3.58	3.31
53	14×⅜	3 ×3	5.9	8.79	169.3	19.26	2.45	0.79
54		3 ×4	8.3	10 23	188.5	18.42	3.03	1.83
55		3 ×5	9.5	10.95	198.3	18.11	3.28	3.21
56		3½×5	10.2	11.37	198.6	17.46	3.31	3.11

ONE PLATE. TWO ANGLES.



	One Plate, Size in Inches.	TWO ANGLES.		Total Area, Square Inches.	AXIS A B.		Eccentricity.	AXIS C D.
		Size in Inches.	Lbs. Per Foot.		I	r^2		r^2
57	15×$\frac{5}{16}$	3 ×3	5.9	8.23	179.9	21.86	2.86	0.82
58		3 ×4	8.3	9.67	200.8	20.77	3.46	1.89
59		3 ×5	9.5	10.39	211.0	20.31	3.73	3.31
60		3½×5	10.2	10.81	211.3	19.55	3.76	3.21
61	15×⅜	3 ×3	5.9	9.17	204.2	22.28	2.57	0.76
62		3 ×4	8.3	10.61	228.6	21.55	3.16	1.77
63		3 ×5	9 5	11.33	240.4	21.23	3.42	3.10
64		3½×5	10.2	11.75	240.9	20.52	3.46	3.02
65	15×½	3 ×3	5.9	11.04	249.6	22 61	2.13	0.68
66		3 ×4	8.3	12.48	279.6	22.40	2.68	1.58
67		3 ×5	9.5	13.20	294.4	22 30	2 94	2.77
68		4 ×5	10.8	13.98	295.4	21.13	3.00	2.65
69	15×⅝	3 ×3	5.9	12.92	292.1	22.62	1.82	0 64
70		3 ×4	8.3	14 36	326.5	22.75	2.33	1.45
71		3 ×5	9 5	15 08	343.8	22 80	2.57	2 53
72		4 ×5	10.8	15.86	345.5	21.79	2.64	2.44
73	16×$\frac{5}{16}$	3 ×4	8.3	9.98	240.5	24 10	3 60	1.81
74		3 ×5	9.5	10.70	252.6	23.61	3.59	3.22
75		4 ×5	10.8	11.48	253.1	22.05	3.93	3.03
76		4 ×6	13.9	13.34	272.9	20.45	4.40	5.13
77	16×⅜	3 ×4	8.3	10.98	273.7	24.92	3.28	1.71
78		3 ×5	9.5	11.70	287.9	24.60	3.56	3.00
79		4 ×5	10.8	12.48	288.7	23.13	3.62	2.85
80		4 ×6	13.9	14 34	312.2	21.77	4.09	4.85
81	16×½	3 ×4	8.3	12.98	334.5	25.77	2.77	1.52
82		3 ×5	9.5	13.70	352.1	25.70	3.04	2.67
83		4 ×5	10.8	14.48	353 9	24 44	3.12	2.56
84		4 ×6	13.9	16.34	384.3	23.52	3.59	4.40

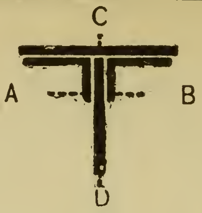
ONE PLATE.



TWO ANGLES.

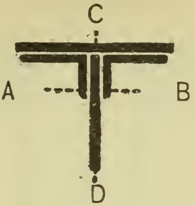
	One Plate, Size in Inches.	TWO ANGLES.		Total Area, Square Inches.	AXIS A B.		Eccentricity.	AXIS C D. r^2
		Size in Inches.	Lbs. Per Foot.		I	r^2		
85	16×⅝	3 ×4	8.3	14.98	390.5	26.07	2.40	1.39
86		3 ×5	9.5	15.70	410.9	26.17	2.65	2.43
87		4 ×5	10.8	16.48	413.7	25.10	2.74	2.35
88		4 ×6	13.9	18.34	450.0	24.53	3.20	4.06
89	18×5/16	3 ×4	8.3	10.61	334.2	31.51	3.86	1.72
90		3 ×5	9.5	11.33	351.0	30.99	4.18	3.04
91		4 ×5	10.8	12.11	352.5	29.12	4.27	2.87
92		4 ×6	13.9	13.97	380.2	27.22	4.80	4.90
93	18×⅜	3 ×4	8.3	11.73	379.7	32.36	3.49	1.60
94		3 ×5	9.5	12.45	399.2	32.06	3.80	2.82
95		4 ×5	10.8	13.23	401.6	30.35	3.90	2.69
96		4 ×6	13.9	15.09	434.5	28.80	4.44	4.61
97	18×½	3 ×4	8.3	13.98	463.5	33.15	2.93	1.41
98		3 ×5	9.5	14.70	487.5	33.16	3.22	2.49
99		4 ×5	10.8	15.48	491.4	31.74	3.34	2.39
100		4 ×6	13.9	17.34	534.2	30.82	3.87	4.15
101	18×⅝	3 ×4	8.3	16.23	540.8	33.32	2.52	1.29
102		3 ×5	9.5	16.95	568.5	33.54	2.79	2.25
103		4 ×5	10.8	17.73	574.2	32.39	2.91	2.18
104		4 ×6	13.9	19.59	624.6	31.88	3.42	3.80
105	18×¾	3 ×4	8.3	18.48	614.2	33.23	2.22	1.20
106		3 ×5	9.5	19.20	644.7	33.58	2.46	2.08
107		4 ×5	10.8	19.98	651.9	32.63	2.59	2.03
108		4 ×6	13.9	21.84	709.0	32.46	3.07	3.53

TWO PLATES. TWO ANGLES.



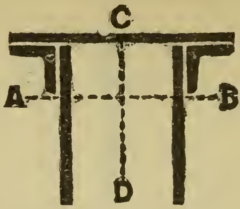
	Web Plate, Size in Inches.	Top Plate, Size in Inches.	TWO ANGLES.		Total Area, Square Inches.	AXIS A B.		Eccentricity.	AXIS C D. r^2
			Size in Inches.	Lbs. Per Ft.		I	r^2		
1	6×¼	7×¼	2½×3	4.4	5.89	14.5	2.46	1.98	2 09
2		7×⅜		6.7	8.15	16.7	2.05	2.15	2.37
3		7×½		9.0	10.40	18.9	1.82	2.24	2.58
4	6×⅜	8×⅜		4.4	7.89	21.8	2 76	2.00	2.73
5		8×½		6.7	10.27	24.5	2 39	2.15	2.97
6		8×⅝		9.0	12.65	27.1	2.14	2.25	3.16
7	7×¼	7×¼	3 ×3	5.9	7.04	22.9	3 25	2.23	1.93
8		7×⅜		7.2	8.70	25.5	2.94	2.41	2.19
9		7×½		9.7	11 07	28.8	2 60	2.52	2.39
10	7×⅜	8×⅜		5.9	9.17	33.8	3.68	2 23	2.50
11		8×½		7.2	10.95	37.1	3.39	2.40	2.76
12		8×⅝		9.7	13.45	41.0	3.05	2.51	2.95
13	8×¼	8×¼	3 ×3	5.9	7.54	32.9	4.36	2.57	2.27
14		8×⅜		7.2	9.32	36.3	3.90	2.78	2.61
15		8×½		9.7	11.82	40.1	3.39	2.93	2.84
16	8×⅜	9×⅜		5.9	9.92	48 8	4.92	2.55	2.99
17		9×½		7.2	11.82	53.1	4.49	2.75	3.32
18		9×⅝		9.7	14.45	57.9	4.01	2 90	3.53
19	9×5/16	9×⅜	3 ×4	8.3	11.17	60.2	5.39	3.08	3.67
20		9×½		11.2	14.03	65.3	4 65	3.27	4.04
21		9×⅝		14.1	16.90	70.2	4.15	3.39	4.33
22	9×⅜	10×⅜		8.3	12.11	70.2	5.80	2.98	4.12
23		10×½		11.2	15.10	76.2	5.05	3.20	4.55
24		10×⅝		14.1	18.09	81.6	4.51	3.34	4.88
25	10×5/16	10×⅜	3 ×4	8.3	11.86	81.3	6.86	3.41	4 17
26		10×½		11.2	14.85	87.6	5.90	3.65	4.58
27		10×⅝		14.1	17.84	93 2	5.23	3.80	4.90
28	10×⅜	12×⅜		8.3	13.23	96.1	7.27	3.35	5.49
29		12×½		11.2	16.47	103.8	6.30	3.61	6.06
30		12×⅝		14.1	19.71	110.4	5.60	3.77	6.39
31	10×½	12×½		8.3	15.98	127.0	7.95	3.29	5.73
32		12×⅝		11.2	19,22	136.1	7.08	3.52	6.15
33		12×¾		14.1	22.46	144.1	6.41	3.69	6.49
34	12×5/16	12×⅜	3 ×5	9.5	13.95	140.0	10.03	4.16	6.34

TWO PLATES. TWO ANGLES.

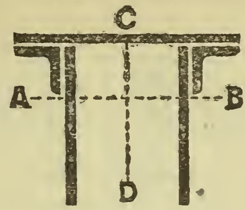


	Web Plate, Size in Inches.	Top Plate, Size in Inches.	TWO ANGLES.		Total Area, Square Inches.	AXIS A B.		Eccentricity.	AXIS C D. r^2
			Size in Inches.	Lbs. Per Ft.		I	r^2		
35	12×$\frac{5}{16}$	12×½	3 ×5	12.9	**17.49**	149.4	**8.54**	4.46	6.93
36		12×⅝		16.2	**20.97**	157.0	**7.49**	4.65	7.38
37		12×¾		19.5	**24.45**	164.2	**6.71**	4.78	7.76
38	12×⅜	14×⅜	3½×5	10.2	**15.87**	165.6	**10.43**	4.03	7.63
39		14×½		13.7	**19.72**	177.7	**9.01**	4.33	8.34
40		14×⅝		17.2	**23.57**	188.2	**7.98**	4.53	8.87
41		14×¾		20.8	**27.48**	197.9	**7.20**	4.68	9.29
42	12×½	14×1		10.2	**26.12**	258.9	**9.91**	4.69	10.17
43		14×1½		13.7	**35.22**	297.9	**8.46**	5.21	11.22
44		14×2		17.2	**44.32**	340.1	**7.67**	5.59	11.87
45	14×⅜	14×⅜	3½×6	11.4	**17.34**	256.3	**14.78**	4.63	8.39
46		14×½		15.4	**21.49**	273.9	**12.74**	5.00	9.24
47		14×⅝		19.3	**25.58**	288.0	**11.26**	5.25	9.88
48		14×¾		23.3	**29.73**	300.4	**10.10**	5.43	10.40
49	14×½	14×1		11.4	**27.84**	392.2	**14.09**	5.30	10.43
50		14×1½		15.4	**37.24**	444.5	**11.94**	5.89	11.55
51		14×2		19.3	**46.58**	495.1	**10.63**	6.32	12.25
52	16×⅜	14×⅜	3½×6	11.4	**18.09**	371.2	**20.52**	5.10	8.04
53		14×½		15.4	**22.24**	396.8	**17.84**	5.56	8.93
54		14×⅝		19.3	**26.33**	416.6	**15.82**	5.88	9.60
55		14×¾		23.3	**30.48**	432.7	**14.19**	6.10	10.15
56	16×½	14×1		11.4	**28.84**	563.2	**19.53**	5.84	10.07
57		14×1½		15.4	**38.24**	631.8	**16.52**	6.53	11.25
58		14×2		19.3	**47.58**	696.5	**14.64**	7.02	11.99
59	18×⅜	14×⅜	3½×6	11.4	**18.84**	514.9	**27.33**	5.54	7.72
60		14×½		15.4	**22.99**	551.2	**23.97**	6.09	8.64
61		14×⅝		19.3	**27.08**	578.0	**21.33**	6.46	9.34
62		14×¾		23.3	**31.23**	599.7	**19.20**	6.74	9.90
63	18×½	14×1		11.4	**29.84**	776.6	**26.03**	6.34	9.73
64		14×1½		15.4	**39.24**	866.7	**22.09**	7.14	10.96
65		14×2		19.3	**48.58**	947.8	**19.51**	7.69	11.75
66	18×⅝	14×1		11.4	**32.09**	921.4	**28.71**	5.89	9.12
67		14×1½		15.4	**41.49**	1037.5	**25.01**	6.75	10.44
68		14×2		19.3	**50.83**	1135.4	**22.34**	7.35	11.30

THREE PLATES — TWO ANGLES.

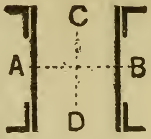


	Two Web Plates, Size in Inches.	Top Plate, Size in Inches.	TWO ANGLES.		Total Area, Square Inches.	AXIS A B.		Eccentricity.	AXIS C D.
			Size in Inches.	Lbs. Per Ft.		I	r^2		r^2
1	9×¼	12×¼	2½×2½	4 9	10.44	78.3	7.50	2.39	13.6
2		12×5/16		4.9	11.19	82.3	7.35	2.55	
3	9×5/16			4.9	12.32	96.5	7.83	2.32	
4		12×⅜		5.9	13.67	102.1	7.47	2.51	13.5
5	9×⅜			5.9	14.79	116.2	7.86	2.32	
6	9×⅜	12×7/16	2½×2½	7.0	16.20	122.1	7.54	2.49	13.4
7	9×7/16			7.0	17.33	136.2	7.86	2 32	
8		12×½		8.0	18.68	142.1	7.61	2.46	13.4
9	9×½			8.0	19.80	156.1	7.88	2.32	
10		12×⅝		8.0	21.30	166.0	7.79	2.52	
11	10×¼	14×¼	3 ×3	5.9	12.04	109.1	9.07	2 71	18.2
12		14×5/16		5 9	12.92	114.4	8.86	2.88	
13	10×5/16			5.9	14.17	134.4	9 49	2.63	
14		14×⅜		7.2	15.82	142.1	8.98	2.84	18.1
15	10×⅜			7.2	17.07	161.9	9 48	2.63	
16	10×⅜	14×7/16	3 ×3	8.4	18 67	169.7	9.09	2 81	18 0
17	10×7/16			8.4	19.92	189.3	9.50	2.64	
18		14×½		9.7	21 57	197.4	9.15	2.79	18.0
1	10×½			9.7	22.82	217.2	9.52	2.64	
20		14×⅝		9.7	24.57	231.1	9.40	2 85	
21	12×¼	15×¼	3 ×3	5.9	13 29	181.7	13 67	3 10	21.8
22		15×5/16		5.9	14 23	190.6	13 39	3.31	
23	12×5/16			5.9	15.73	223.4	14.21	2.99	
24		15×⅜		7.2	17.45	236.3	13 55	3.26	21.6
25	12×⅜			7.2	18.95	269.0	14 20	3.00	
26	12×⅜	15×7/16	3 ×3	8.4	20.60	282.1	13.69	3.22	21.5
27	12×7/16			8.4	22.10	314.9	14 25	3.00	
28		15×½		9.7	23 82	328.0	13.77	3 20	21.5
29	12×½			9.7	25.32	360.4	14.23	3.01	
30		15×⅝		9.7	27.20	382.3	14.06	3.25	
31	12×⅝	15×⅝	3 ×3	9.7	30.20	447.0	14.81	2.93	
32	14×¼	16×¼		5.9	14.54	280.0	19.26	3.46	25.9
33		16×5/16		5 9	15.54	294 0	18 92	3.70	
34	14×5/16			5.9	17.29	344.1	19 90	3 33	
35		16×⅜		7.2	19.07	364 3	19.11	3 64	25.6

THREE PLATES  TWO ANGLES.

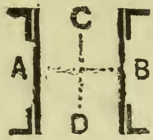
	Two Web Plates, Size in Inches.	Top Plate, Size in Inches.	TWO ANGLES.		Total Area, Square Inches.	AXIS A B.		Eccentricity.	AXIS C D. r^2
			Size in Inches.	Lbs. Per Ft.		I	r^2		
36	14× ⅜	16× ⅜	3 ×3	7.2	20.82	414.2	19 89	3.34	
37		16× 7/16		8.4	22.54	431.7	19.15	3.62	25.5
38	14× 7/16			8.4	24 29	484.1	19.93	3.34	
39		16× ½		9.7	26 07	505.0	19.37	3.57	25.4
40	14× ½			9.7	27.82	554.6	19 94	3 35	
41	14× ½	16× ⅝	3 ×3	9.7	29.82	587 6	19.70	3 63	
42	14× ⅝			9.7	33.32	684.6	20 55	3 25	
43		16× ¾		12 2	36 82	731.2	19 86	3.59	24.9
44	14× ¾			12 2	40 32	828.9	20 56	3.28	
45	15× ¼	18× ¼		5.9	15 54	346.2	22.28	3 72	35.4
46	15× ¼	18× 5/16	3 ×3	5.9	16.67	363.5	21 81	4 00	
47	15× 5/16			5 9	18 54	425.5	22 95	3.59	
48		18× ⅜		7.2	20.45	450.4	22 03	3.93	34.8
49	15× ⅜			7.2	22.32	512 2	22.95	3 60	
50		18× 7/16		8.4	24 17	542.2	22 44	3.89	34.7
51	15× 7/16	18× 7/16	3 ×3	8.4	26.04	604.3	23 21	3 60	
52		18× ½		9.7	27.95	624.8	22 36	3.86	34.7
53	15× ½			9.7	29.82	685.8	23 00	3 61	
54		18× ⅝		9.7	32.07	727.0	22 67	3.93	
55	15× ⅝			9.7	35.82	849.1	23.70	3 52	
56	15× ⅝	18× ¾	3 ×3	12.2	39 57	904.6	22 86	3 88	33.9
57	15× ¾			12.2	43.32	1026.6	23 70	3.55	
58	16× ¼	20× ¼	3½×3½	8.3	17.98	433.4	24 10	4.20	43.3
59		20× 5/16		8.3	19.23	452.8	23.55	4 46	
60	16× 5/16			8.3	21.23	531.5	25.03	4.04	
61	16× 5/16	20× ⅜	3½×3½	8.3	22.48	553 4	24 62	4 28	
62	16× ⅜			8 3	24.48	629.7	25.73	3.93	
63		20× 7/16		9 7	26.57	660.0	24 84	4.23	41.7
64	16× 7/16			9.7	28 57	735.8	25.75	3.93	
65		20× ½		11.2	30.72	767.6	24.99	4.20	41.7
66	16× ½	20× ½	3½×3½	11.2	32 72	843 2	25 77	3.94	
67		20× ⅝		12 7	36.12	897.9	24.86	4.33	41.4
68	16× ⅝			14.1	40.96	1058 0	25 83	3 95	41.2
69		20× ¾		15.6	44.36	1116.6	25 17	4.27	41.2
70	16× ¾			17.0	49.20	1274.6	25.91	3.96	41.1

TWO PLATES. FOUR ANGLES.



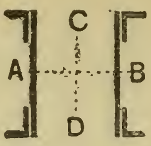
	Two Web Plates, Size in Inches.	FOUR ANGLES.		Total Area Square Inches.	AXIS A B.		AXIS C D.	
		Size in Inches.	Lbs. Per Foot.		I	r²	Out to Out Webs.	I
1	8×¼	2×2	3.1	7.72	66.0	8.55	5.3	66.0
2			3.3	7.96	68.6	8.62		
3			4.2	9.04	80.2	8.88		
4			5.0	10.00	90.3	9.03		
5			5.6	10.72	97.2	9.07	5.3	103.6
6	8×5/16	2×2	3.1	8.72	71.3	8.18	5.2	69.1
7			3.3	8.96	74.0	8.26		
8			4.2	10.04	85.6	8.52		
9			5.0	11.00	95.6	8.69		
10			5.6	11.72	102.6	8.75	5.2	105.8
11	8×⅜	2×2	3.1	9.72	76.7	7.89	5.2	74.2
12			3.3	9.96	79.3	7.96		
13			4.2	11.04	90.9	8.23		
14			5.0	12.00	100.9	8.41		
15			5.6	12.72	107.9	8.48	5.2	110.8
16	9×¼	2×2	3.1	8.22	88.6	10.78	6.1	89.2
17			3.8	9.06	100.8	11.12		
18			4.6	10.02	114.0	11.37		
19			5.4	10.98	127.0	11.57		
20			5.6	11.22	130.1	11.60	6.1	135.7
21	9×5/16	2×2	3.1	9.35	96.3	10.30	6.1	97.8
22			3.6	9.95	105.1	10.56		
23			4.5	11.03	120.2	10.89		
24			5.3	11.99	132.9	11.08		
25			5.6	12.35	137.8	11.15	6.1	144.3
26	9×⅜	2×2	3.1	10.47	103.8	9.92	6.0	102.7
27			3.5	10.95	110.7	10.11		
28			4.4	12.03	125.9	10.47		
29			5.2	12 99	139.1	10.71		
30			5.6	13.47	145.3	10.79	6.0	148.1

TWO PLATES. FOUR ANGLES.



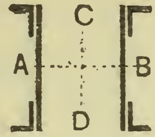
	Two Web Plates, Size in Inches.	FOUR ANGLES.		Total Area Square Inches.	AXIS A B.		AXIS C D.	
		Size in Inches.	Lbs. Per Foot.		I	r^2	Out to Out Webs.	I
31	10×¼	2½×3	4.4	10.28	144.1	14.02	6.5	144.9
32			5.0	11.00	157.1	14.28		
33			5.8	11.96	174.4	14.58		
34			6.7	13.04	193.0	14.80		
35			7.5	14.00	209.6	14.97		
36			8.3	14.96	225.1	15.04		
37			9.0	15.80	238.7	15.11	6.5	258.7
38	10×5/16	2½×3	4.4	11.53	154.5	13.40	6.5	155.9
39			4.8	12.01	163.4	13.60		
40			5.6	12.97	180.2	13.89		
41			6.5	14.05	199.6	14.20		
42			7.3	15.01	215.6	14.36		
43			8.1	15.97	231.8	14.52		
44			9.0	17.05	249.2	14.61	6.5	269.7
45	10×⅜	2½×3	4.4	12.78	164.9	12.90	6.5	166.4
46			4.6	13.02	169.1	12.99		
47			5.4	13.98	186.6	13.35		
48			6.2	14.94	203.8	13.64		
49			7.1	16.02	222.2	13.87		
50			7.9	16.98	237.8	14.00		
51			8.7	17.94	253.9	14.15		
52			9.0	18.30	259.6	14.18	6.5	280.2
53	12×¼	2½×3	4.4	11.28	226.	19.99	8.1	227.
54			5.0	12.00	245.	20.44		
55			5.8	12.96	272.	20.95		
56			6.7	14.04	300.	21.37		
57			7.5	15.00	325.	21.70		
58			8.3	15.96	349.	21.89		
59			9.0	16.80	371.	22.06	8.1	383.

TWO PLATES.



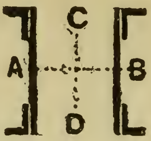
FOUR ANGLES.

	Two Web Plates, Size in Inches.	FOUR ANGLES.		Total Area Square Inches.	AXIS A B.		AXIS C D.	
		Size in Inches.	Lbs. Per Foot.		I	r^2	Out to Out Webs.	I
60	12×$\frac{5}{16}$	2½×3	4.4	12.78	244.	19.05	8.0	243.
61			4.6	13.02	250.	19.20		
62			5.4	13.98	276.	19.77		
63			6.2	14.94	303.	20.25		
64			7.1	16.02	331.	20.65		
65			7.9	16.98	355.	20.91		
66			8.7	17.94	380.	21.16		
67			9.0	18.30	389.	21.23	8.0	396.
68	12×⅜	2½×3	4.4	14.28	262.	18.31	8.0	263.
69			5.0	15.00	281.	18.75		
70			5.8	15.96	308.	19.27		
71			6.7	17.04	336.	19.72		
72			7.5	18.00	361.	20.08		
73			8.3	18.96	385.	20.33		
74			9.0	19.80	407.	20.53	8.0	416.
75	14×¼	3 ×3	5.9	14.08	387.	27.5	9.6	386.
76			6.0	14.20	392.	27.6		
77			6.5	14.80	413.	27.9		
78			7.0	15.40	435.	28.3		
79			8.0	16.60	478.	28.8		
80			9.0	17.80	519.	29.2		
81			10.0	19.00	560.	29.5		
82			11.0	20.20	600.	29.7	9.6	611.
83	14×$\frac{5}{16}$	3 ×3	5.9	15.83	416.	26.3	9.6	422.
84			6.0	15.95	421.	26.4		
85			6.5	16.55	442.	26.7		
86			7.0	17.15	464.	27.0		
87			8.0	18.35	506.	27.6		
88			9.0	19.55	548.	28.0		
89			10.0	20.75	589.	28.4		
90			11.0	21.95	629.	28.6	9.6	646.

TWO PLATES.  FOUR ANGLES.

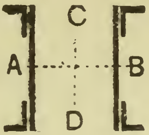
	Two Web Plates, Size in Inches.	FOUR ANGLES.		Total Area Square Inches.	AXIS A B.		AXIS C D.	
		Size in Inches.	Lbs. Per Foot.		I	r^2	Out to Out Webs.	I
91	14×⅜	3×3	5.9	17.58	444.	25.3	9.5	447.
92			6.0	17.70	449.	25.4		
93			6.5	18.30	470.	25.7		
94			7.0	18.90	492.	26.1		
95			8.0	20.10	535.	26.6		
96			9.0	21.30	576.	27.1		
97			10.0	22.50	617.	27.4		
98			11.0	23.70	657.	27.7	9.5	669.
99	14×$\frac{7}{16}$	3×3	5.9	19.33	473.	24.5	9.5	480.
100			6.0	19.45	478.	24.6		
101			6.5	20.05	499.	24.9		
102			7.0	20.65	521.	25.2		
103			8.0	21.85	563.	25.8		
104			9.0	23.05	605.	26.2		
105			10.0	24.25	646.	26.6		
106			11.0	25.45	686.	26.9	9.5	701.
107	14×½	3×3	5.9	21.08	502.	23.8	9.5	512.
108			6.0	21.20	506.	23.9		
109			6.5	21.80	528.	24.2		
110			7.0	22.40	550.	24.5		
111			8.0	23.60	592.	25.1		
112			9.0	24.80	634.	25.6		
113			10.0	26.00	674.	25.9		
114			11.0	27.20	714.	26.3	9.5	733.
115	15×¼	3×3	5.9	14.58	459.	31.5	10.4	459.
116			6.0	14.70	464.	31.6		
117			6.5	15.30	489.	32.0		
118			7.0	15.90	515.	32.4		
119			8.0	17.10	564.	33.0		
120			9.0	18.30	614.	33.5		
121			10.0	19.50	662.	33.9		
122			11.0	20.70	709.	34.2	10.4	714.

TWO PLATES. FOUR ANGLES.



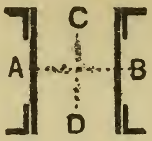
	Two Web Plates, Size in Inches.	FOUR ANGLES.		Total Area Square Inches.	AXIS A B.		AXIS C D.	
		Size in Inches.	Lbs. Per Foot.		I	r^2	Out to Out Webs.	I
123	15×5/16	3×3	5.9	16.46	494.	30.0	10.3	496.
124			6.0	16.58	499.	30.1		
125			6.5	17.18	524.	30.5		
126			7.0	17.78	550.	30.9		
127			8.0	18.98	600.	31.6		
128			9.0	20.18	649.	32.2		
129			10.0	21.38	697.	32.6		
130			11.0	22.58	744.	32.9	10.3	747.
131	15×3/8	3×3	5.9	18.33	529.	28.9	10.2	529.
132			6.0	18.45	535.	29.0		
133			6.5	19.05	560.	29.4		
134			7.0	19.65	585.	29.8		
135			8.0	20.85	635.	30.5		
136			9.0	22.05	684.	31.0		
137			10.0	23.25	732.	31.5		
138			11.0	24.45	779.	31.9	10.2	776.
139	15×7/16	3×3	5.9	20.20	564.	27.9	10.2	570.
140			6.0	20.32	570.	28.0		
141			6.5	20.92	595.	28.4		
142			7.0	21.52	620.	28.8		
143			8.0	22.72	670.	29.5		
144			9.0	23.92	719.	30.1		
145			10.0	25.12	767.	30.5		
146			11.0	26.32	814.	30.9	10.2	817.
147	15×1/2	3×3	5.9	22.08	599.	27.1	10.2	610.
148			6.0	22.20	605.	27.2		
149			6.5	22.80	630.	27.6		
150			7.0	23.40	656.	28.0		
151			8.0	24.60	705.	28.7		
152			9.0	25.80	754.	29.2		
153			10.0	27.00	802.	29.7		
154			11.0	28.20	849.	30.1	10.2	858.

TWO PLATES. FOUR ANGLES.



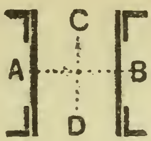
	Two Web Plates, Size in Inches.	FOUR ANGLES.		Total Area Square Inches.	AXIS A B.		AXIS C D.	
		Size in Inches.	Lbs. Per Foot.		I	r^2	Out to Out Webs.	I
155	$15\times\frac{9}{16}$	3×3	5.9	23.96	635.	26.5	10.1	637.
156			6.0	24.08	640.	26.6		
157			6.5	24.68	665.	27.0		
158			7.0	25.28	691.	27.3		
159			8.0	26.48	740.	28.0		
160			9.0	27.68	789.	28.5		
161			10.0	28.88	837.	29.0		
162			11.0	30.08	884.	29.4	10.1	881.
163	$15\times\frac{5}{8}$	3×3	5.9	25.83	670.	25.9	10.1	675.
164			6.0	25.95	675.	26.0		
165			6.5	26.55	700.	26.4		
166			7.0	27.15	726.	26.7		
167			8.0	28.35	776.	27.4		
168			9.0	29.55	825.	27.9		
169			10.0	30.75	873.	28.4		
170			11.0	31.95	920.	28.8	10.1	918.
171	$15\times\frac{11}{16}$	3×3	5.9	27.71	705.	25.4	10.1	711.
172			6.0	27.83	710.	25.5		
173			6.5	28.43	735.	25.9		
174			7.0	29.03	761.	26.2		
175			8.0	30.23	811.	26.8		
176			9.0	31.43	860.	27.4		
177			10.0	32.63	908.	27.8		
178			11.0	33.83	955.	28.2	10.1	954
179	$15\times\frac{3}{4}$	3×3	5.9	29.58	740.	25.0	10.1	745.
180			6.0	29.70	745.	25.1		
181			6.5	30.30	770.	25.4		
182			7.0	30.90	796.	25.8		
183			8.0	32.10	846.	26.4		
184			9.0	33.30	895.	26.9		
185			10.0	34.50	943.	27.3		
186			11.0	35.70	990.	27.7	10.1	939

TWO PLATES. FOUR ANGLES.



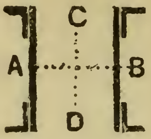
	Two Web Plates, Size in Inches.	FOUR ANGLES.		Total Area Square Inches.	AXIS A B.		AXIS C D.	
		Size in Inches.	Lbs. Per Foot.		I	r^2	Out to Out Webs.	I
187	16×¼	3×3	5.9	15.08	538.	35.7	11.2	541.
188			6.0	15.20	544.	35.8		
189			6.5	15.80	573.	36.3		
190			7.0	16.40	603.	36.7		
191			8.0	17.60	660.	37.5		
192			9.0	18.80	717.	38.1		
193			10.0	20.00	773.	38 6		
194			11.0	21.20	828.	39.0	11.2	829.
195	16×5/16	3×3	5.9	17.08	580.	34.0	11.1	588.
196			6.7	18.04	628.	34.8		
197			7.5	19.00	674.	35.5		
198			8.3	19 96	720.	36.1		
199			9.2	21.04	770.	36.6		
200			10.0	22.00	815.	37.1		
201			10.8	22.96	860.	37.5		
202			11.7	24.04	908.	37.8	11.1	912.
203	16×⅜	3×3	5.9	19 08	623.	32.7	11.0	631.
204			6.7	20.04	671.	33.5		
205			7 5	21.00	716.	34.1		
206			8.3	21.96	763.	34.7		
207			9.2	23.04	813.	35 3		
208			10 0	24 00	858.	35.8		
209			10.8	24.96	903.	36.2		
210			11.7	26.04	951.	36.5	11.0	950.
211	16×7/16	3×3	5.9	21.08	666.	31.6	10.9	671.
212			6.7	22.04	713.	32.4		
213			7.5	23.00	759.	33.0		
214			8.3	23.96	805.	33 6		
215			9.2	25.04	856.	34 2		
216			10.0	26.00	901.	34.6		
217			10.8	26.96	945.	35.1		
218			11.7	28.04	994.	35.4	10.9	985.

TWO PLATES. FOUR ANGLES.



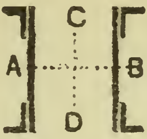
	Two Web Plates, Size in Inches.	FOUR ANGLES.		Total Area Square Inches.	AXIS A B.		AXIS C D.	
		Size in Inches.	Lbs. Per Foot.		I	r^2	Out to Out Webs.	I
219	16×½	3×3	5.9	23.08	708.	30.7	10.9	721.
220			6.7	24.04	756.	31.4		
221			7.5	25.00	802	32.1		
222			8.3	25.96	848.	32.7		
223			9.2	27.04	898.	33.2		
224			10.0	28.00	943.	33.7		
225			10.8	28.96	988.	34.1		
226			11.7	30.04	1036.	34.5	10.9	1035.
227	16×9/16	3×3	10.0	30.00	986.	32.9	10.9	988.
228			10.8	30.96	1031.	33.3		
229	16×⅝		10.0	32.00	1029.	32.2		
230			10.8	32.96	1073.	32.6		
231	16×11/16		10.0	34.00	1071.	31.5		
232			10.8	34.96	1116	31.9		
233	16×¾		10.0	36.00	1114	31.0		
234			10.8	36.96	1159	31.4	10.9	1169.
235	18×⅜	3×3	5.9	20.58	840	40.8	12.3	834.
236			6.3	21.06	871	41.4		
237			7.1	22.02	932.	42.3		
238			7.9	22.98	992.	43.2		
239			8.8	24.06	1060	44.1		
240			9.6	25.02	1119	44.7		
241			10.4	25.98	1176.	45.3		
242			11.3	27.06	1242	45.9	12.6	1242.
243	18×½	3×3	5.9	25.08	961.	38.3	12.2	965.
244			6.7	26.04	1023	39.3		
245			7.5	27.00	1083.	40.1		
246			8.3	27.96	1144	40.9		
247			9.2	29.04	1210.	41.7		
248			10.0	30.00	1269.	42.3		
249			10.8	30.96	1337.	42.9		
250			11.7	32.04	1391.	43.4	12.4	1384.

TWO PLATES. FOUR ANGLES.



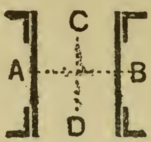
	Two Web Plates, Size in Inches.	FOUR ANGLES.		Total Area Square Inches.	AXIS A B.		AXIS C D.	
		Size in Inches.	Lbs. Per Foot.		I	r^2	Out to Out Webs.	I
251	18×⅝	3 ×3	6.3	30.06	1114.	37.0	12.1	1110.
252			7.1	31.02	1175.	37.9		
253			7.9	31.98	1235.	38.6		
254		3½×3½	8.8	33.06	1292.	39.1		
255			9.6	34.02	1351.	39.7		
256			10.4	34.98	1409.	40.3		
257			11.3	36.06	1474.	40.9		
258			12.1	37.02	1531.	41.4	12.3	1548.
259	18×¾	3½×3½	8.3	36.96	1376.	37.2	12.1	1377.
260			9.2	38.04	1443.	37.9		
261			10.0	39.00	1502.	38.5		
262			10.8	39.96	1559.	39.0		
263			11.7	41.04	1624.	39.6		
264			12.5	42.00	1681.	40.0		
265			13.3	42.96	1737.	40.4		
266			14.2	44.04	1800	40.9	12.3	1827.
267	21×½	3½×3½	8.3	30.96	1680	54.3	14.3	1675
268			9.2	32.04	1775.	55.4		
269			10.0	33.00	1858.	56.3		
270			10.8	33.96	1940.	57.1		
271			11.7	35.04	2032.	58.0		
272			12.5	36.00	2113.	58.7		
273			13.3	36.96	2193.	59.3		
274			14.2	38.04	2282.	60.0	14.6	2282.
275	21×⅝	3½×3½	8.3	36.21	1873.	51.7	14.2	1877.
276			9.0	37.05	1946.	52.5		
277			9.8	38.01	2029.	53.4		
278			10.6	38.97	2113.	54.2		
279			11.5	40.05	2203.	55.0		
280			12.3	41.01	2284.	55.7		
281			13.1	41.97	2367.	56.4		
282			14.0	43.05	2454.	57.0	14.5	2470.

TWO PLATES. FOUR ANGLES.



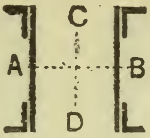
	Two Web Plates, Size in Inches.	FOUR ANGLES.		Total Area, Square Inches.	AXIS A B.		AXIS C D.	
		Size in Inches.	Lbs. Per Foot.		I	r²	Out to Out Webs.	I
283	21×¾	3½×3½	8.8	42.06	2119.	50.4	14.2	2133.
284			9.6	43.02	2202.	51.2		
285			10.4	43.98	2285.	51.9		
286			11.3	45.06	2377.	52.8		
287			12.1	46.02	2458.	53.4		
288			12.9	46.98	2539.	54.0		
289			13.8	48.06	2629.	54.7		
290			14.6	49.02	2707.	55.2	14.4	2713.
291	22×½	4×4	9.5	33.40	2013.	60.3	15.0	2025.
292			13.4	38.08	2451.	64.4		
293			16.7	42.04	2809.	66.8		
294			19.5	45.40	3105.	68.4	15.3	3139.
295	22×⅝	4×4	9.5	38.90	2235.	57.5	14.8	2231.
296			13.4	43.58	2673.	61.3		
297			16.7	47.54	3031.	63.8		
298			19.5	50.90	3326.	65.4	15.1	3333.
299	22×¾	4×4	9.5	44.40	2457.	55.3	14.7	2446.
300			13.4	49.08	2895.	59.0		
301			16.7	53.04	3253.	61.3		
302			19.5	56.40	3548.	62.9	15.0	3548.
303	22×⅞	4×4	9.5	49.90	2679.	53.7	14.7	2682.
304			13.4	54.58	3116.	57.1		
305			16.7	58.54	3475	59.4		
306			19.5	61.90	3770	60.9	14.9	3746.
307	22×1	4×4	9.5	55.40	2900.	52.4	14.7	2908.
308			13.4	60.08	3338.	55.6		
309			16.7	64.04	3696.	57.7		
310			19.5	67.40	3992.	59.2	14.9	3979.

TWO PLATES. FOUR ANGLES.



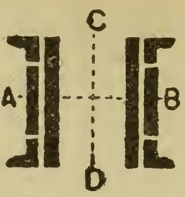
	Two Web Plates, Size in Inches.	FOUR ANGLES.		Total Area, Square Inches.	AXIS A B.		AXIS C D.	
		Size in Inches.	Lbs. Per Foot.		I	r^2	Out to Out Webs.	I
311	22×1¼	4×4	9.5	66.40	3344.	50.4	14.7	3334.
312			13.4	71.08	3782.	53.2		
313			16.7	75.04	4140.	55.2		
314			19.5	78.40	4436.	56.6	14.9	4420.
315	22×1½	4×4	9.5	77.40	3788.	48.9	14.8	3780.
316			13.4	82.08	4226.	51.5		
317			16.7	86.04	4584.	53.3		
318			19.5	89.40	4879.	54.6	15.0	4890.
319	24×½	4×4	9.5	35.40	2514.	71.0	16.3	2500.
320			13.4	40.08	3046.	76.0		
321			16.7	44.04	3483.	79.1		
322			19.5	47.40	3844.	81.1	16.8	3858.
323	24×⅝	4×4	9.5	41.40	2802.	67.7	16.1	2778.
324			13.4	46.08	3334.	72.4		
325			16.7	50.04	3771.	75.4		
326			19.5	53.40	4132.	77.4	16.6	4133.
327	24×¾	4×4	9.5	47.40	3090.	65.2	16.0	3065.
328			13.4	52.08	3622.	69.6		
329			16.7	56.04	4059.	72.4		
330			19.5	59.40	4420.	74.4	16.5	4429.
331	24×⅞	4×4	9.5	53.40	3378.	63.3	16.0	3375.
332			13.4	58.08	3910.	67.3		
333			16.7	62.04	4347.	70.1		
334			19.5	65.40	4708.	72.0	16.4	4706.
335	24×1	4×4	9.5	59.40	3666.	61.7	16.0	3674.
336			13.4	64.08	4198.	65.5		
337			16.7	68.04	4635.	68.1		
338			19.5	71.40	4996.	70.0	16.4	5023.

TWO PLATES. FOUR ANGLES.



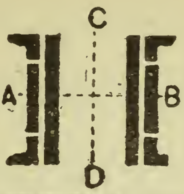
	Two Web Plates, Size in Inches.	FOUR ANGLES.		Total Area, Square Inches.	AXIS A B.		AXIS C D.	
		Size in Inches.	Lbs. Per Foot.		I	r^2	Out to Out Webs.	I
339	24×1¼	4×4	9.5	71.40	4242.	59.4	16.0	4241.
340			13.4	76.08	4774.	62.8		
341			16.7	80.04	5211.	65.1		
342			19.5	83.40	5572.	66.8	16.3	5556.
343	24×1½	4×4	9.5	83.40	4818.	57.8	16.1	4831.
344			13.4	88.08	5350.	60.7		
345			16.7	92.04	5787.	62.9		
346			19.5	95.40	6148	64.5	16.4	6182.
347	27×½	4×4	9.5	38.40	3399.	88.5	18.4	3400.
348			13.4	43.08	4091.	95.0		
349			16.7	47.04	4660.	99.1		
350			19.5	50.40	5133.	101.8	19.1	5154.
351	27×¾	4×4	9.5	51.90	4219	81.3	18.0	4205.
352			13.4	56.58	4911.	86.8		
353			16.7	60.54	5480.	90.5		
354			19.5	63.90	5953.	93.2	18.6	5920.
355	27×1	4×4	9.5	65.40	5040.	77.1	18.0	5096.
356			13.4	70.08	5731.	81.8		
357			16.7	74.04	6301.	85.1		
358			19.5	77.40	6773.	87.5	18.5	6806.
359	27×1¼	4×4	9.5	78.90	5860.	74.3	17.9	5865.
360			13.4	83.58	6551.	78.4		
361			16.7	87.54	7121.	81.3		
362			19.5	90.90	7593.	83.5	18.4	7615.
363	27×1½	4×4	9.5	92.40	6680	72.3	17.9	6635.
364			13.4	97.08	7371.	75.9		
365			16.7	101.04	7941.	78.6		
366			19.5	104.40	8413.	80.6	18.4	8437

FOUR PLATES. FOUR ANGLES.



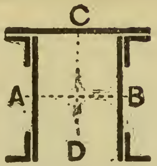
	Two Web Plates, Size in Inches.	Two Side Plates, Size in Inches.	FOUR ANGLES.		Total Area in Square Inches.	AXIS A B.		Out to Out of Webs for Equal I
			Size in Inches.	Lbs. per foot.		I	r^2	
1	22× ½	13×½	4×4	9.5	46.40	2196	47.33	13.2
2				13.4	51 08	2634	51.57	
3				16.7	55.04	2992	54 36	
4				19.5	58.40	3288	56.30	13.8
5	22× ⅝	13×9/16	4×4	9.5	53.53	2441	45.60	13.1
6				13.4	58.21	2879	49 46	
7				16.7	62.17	3237	52 07	
8				19.5	65 53	3532	53.91	13.7
9	22× ¾	13×⅝	4×4	9 5	60 65	2686	44.28	13.0
10				13.4	65.33	3123	47.81	
11				16.7	69 29	3482	50.25	
12				19 5	72.65	3777	51.99	13.6
13	22× ⅞	13×11/16	4×4	9.5	67.78	2930	43.23	13.0
14				13.4	72.46	3368	46 49	
15				16.7	76.42	3726	48.76	
16				19.5	79.78	4022	50.42	13.5
17	22×1	13×¾	4×4	9.5	74.90	3175	42.39	13.0
18				13.4	79.58	3613	45.40	
19				16.7	83.54	3971	47.54	
20				19.5	86.90	4267	49.10	13.5
21	22×1¼	13×13/16	4×4	9.5	87.53	3642	41.61	13.1
22				13 4	92.21	4079	44 24	
23				16.7	96.17	4438	46.15	
24				19.5	99.53	4733	47.56	13.6
25	22×1½	13×⅞	4×4	9.5	100.15	4108	41.02	13.2
26				13.4	104.83	4546	43 36	
27				16.7	108.79	4904	45.08	
28				19.5	112.15	5200	46 36	13.6

FOUR PLATES. FOUR ANGLES.



	Two Web Plates, Size in Inches.	Two Side Plates, Size in Inches.	FOUR ANGLES.		Total Area in Square Inches.	AXIS A B.		Out to Out of Webs for Equal I
			Size in Inches.	Lbs. per foot.		I	r²	
29	24× ½	15× ½	4×4	9.5	50.40	2795	55.46	14.4
30				13.4	55.03	3327	60.40	
31				16.7	59.04	3764	63.75	
32				19.5	62.40	4126	66.15	15.2
33	24× ⅝	15× 9/16	4×4	9.5	58.28	3118	53.50	14.3
34				13.4	62.96	3651	58.00	
35				16.7	66.92	4087	61.08	
36				19.5	70.28	4449	63.31	15.0
37	24× ¾	15× ⅝	4×4	9.5	66.15	3441	52.02	14.2
38				13.4	70.83	3974	56.10	
39				16.7	74.79	4411	58.97	
40				19.5	78.15	4772	61.06	14.9
41	24× ⅞	15× 11/16	4×4	9.5	74.03	3764	50.86	14.1
42				13.4	78.71	4297	54.60	
43				16.7	82.67	4734	57.26	
44				19.5	86.03	5095	59.23	14.8
45	24×1	15× ¾	4×4	9.5	81.90	4088	49.91	14.1
46				13.4	86.58	4620	53.36	
47				16.7	90.54	5057	55.85	
48				19.5	93.90	5418	57.70	14.7
49	24×1¼	15× 13/16	4×4	9.5	95.78	4699	49.06	14.2
50				13.4	100.46	5231	52.07	
51				16.7	104.42	5668	54.28	
52				19.5	107.78	6029	55.94	14.7
53	24×1½	15× ⅞	4×4	9.5	109.65	5310	48.43	14.4
54				13.4	114.33	5842	51.10	
55				16.7	118.29	6279	53.08	
56				19.5	121.65	6640	54.58	14.8

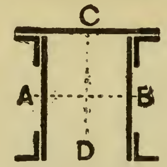
THREE PLATES. FOUR ANGLES.



	Two Web Plates. Size in inches.	Top Plate. Size in inches.	TOP ANGLE.		BOTTOM ANGLE.		Total Area, square inches.	AXIS A B.		Excen-tricity.	$\frac{T-B}{A}$	AXIS C D.
			Size in inches.	Lbs. per ft.	Size in inches.	Lbs. per ft.		I	r^2			I
1	12×¼	14×¼	2½×2½	4.9	2½×3	8.9	**17.78**	429.3	**24.1**	0.51	.0619	423.9
2	12×5/16					8.7	**19.16**	444.3	**23.2**	0.51	.0637	446.2
3	12×⅜					8.5	**20.54**	459.3	**22.4**	0.50	.0652	467.8
4	12×7/16					8.3	**21.92**	473.6	**21.6**	0.50	.0666	489.0
5	12×½					8.1	**23.30**	488.6	**21.0**	0.49	.0678	509.0
6	12×9/16					7.8	**24.62**	501.4	**20.4**	0.50	.0715	526.1
7	12×⅝					7.6	**26.00**	515.8	**19.8**	0.50	.0723	545.4
8	12×⅝			5.3		8.0	**26.48**	528.5	**20.0**	0.49	.0710	560.5
9	14×¼	17×¼	3×3	5.9	3×4	8.6	**19.95**	650.	**32.6**	1.00	.1318	696.
10				7.0		9.4	**21.09**	690.	**32.7**	1.00	.1332	750.
11		17×5/16		5.9		10.2	**21.97**	739.	**33.6**	1.00	.1243	772.
12				6.9		10.9	**22.99**	774.	**33.7**	1.00	.1266	820.
13	14×5/16			5.9		9.8	**23.48**	757.	**32.2**	1.00	.1265	807.
14				6.5		10.2	**24.08**	778.	**32.3**	1.00	.1283	835.
15				7.4		10.8	**24.98**	809.	**32.4**	1.01	.1309	878.
16		17×⅜		5.9		11.4	**25.51**	847.	**33.2**	1.00	.1206	883.
17				6.4		11.7	**25.99**	863.	**33.2**	1.01	.1229	905.

18	14×3/8	17×3/8	3×3	5.9	3×4	11.0	27.02	866	32.0	1.00	.1229	917
19				6.8		11.7	27.98	901	32.2	0.99	.1229	961
20				7.8		12.4	29.00	935	32.2	1.00	.1248	1011
21		17×7/16		5.9		12.6	29.04	955	32.9	1.01	.1178	992
22				6.8		13.3	30.00	989	33.0	1.00	.1180	1038
23				7.8		14.0	31.02	1023	33.0	1.00	.1199	1088
24	14×7/16			7.3		13.3	32.05	1027	32.0	0.99	.1198	1097
25				8.3		13.9	33.01	1057	32.0	1.01	.1236	1145
26				9.2		14.6	33.97	1090	32.1	1.00	.1236	1192
27	14×1/2	17×1/2		6.8		14.1	35.04	1117	31.9	1.00	.1176	1179
28				7.7		14.8	36.00	1149	31.9	1.00	.1178	1227
29	14×9/16			7.2		14.0	36.97	1149	31.1	1.00	.1196	1231
30	14×5/8			6.8		13.3	38.06	1155	30.3	1.00	.1209	1239
31				7.8		14.0	39.08	1189	30.4	1.00	.1223	1289
32	14×11/16			7.3		13.2	40.05	1189	29.7	1.00	.1238	1291
33				8.3		13.9	41.07	1223	29.8	1.00	.1252	1341
34				9.2		14.5	41.97	1253	29.9	1.00	.1268	1385
35	14×3/4			8.7		13.8	43.00	1257	29.2	1.00	.1265	1388
36				9.7		14.5	44.02	1291	29.3	1.00	.1277	1439
37	15×3/8	15×3/8	3×3	5.9	3×3	10.0	26.42	934	35.4	1.05	.1198	605
38				6.0		10.3	26.66	946	35.5	1.01	.1142	612
39				7.5	3×4	11.3	28.16	1021	36.3	0.99	.1188	693
40				8.3		11.9	29.00	1054	36.4	0.99	.1195	724
41				9.3		12.5	29.96	1092	36.5	1.00	.1238	758
42				10.3		13.2	30.98	1132	36.5	1.01	.1256	795
43				11.3		14.0	32.06	1174	36.6	1.00	.1249	835

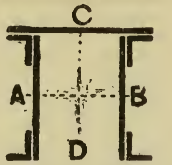
THREE PLATES. FOUR ANGLES.



	Two Web Plates. Size in inches.	Top Plate. Size in inches.	TOP ANGLE.		BOTTOM ANGLE.		Total Area, square inches	AXIS A B.		Excentricity.	$\frac{T-B}{A}$	AXIS C D.
			Size in inches.	Lbs. per ft.	Size in inches.	Lbs. per ft.		I	r^2			I
44	$15\times\frac{1}{4}$	$18\times\frac{1}{4}$	3×3	5.9	3×4	9.2	21.06	793	37.7	0.99	.1197	853
45				6.9		9.9	22.08	835	37.8	1.00	.1223	908
46		$18\times\frac{5}{16}$		5.9		10.9	23.21	901	38.8	1.00	.1133	944
47				6.7		11.5	24.05	936	38.9	0.99	.1143	989
48	$15\times\frac{5}{16}$			5.9		10.5	24.84	925	37.3	0.99	.1153	990
49				7.1		11.3	26.04	974	37.4	1.00	.1192	1055
50		$18\times\frac{3}{8}$		5.9		12.2	26.99	1034	38.3	1.00	.1100	1083
51				6.9		12.9	28.01	1076	38.4	1.00	.1125	1138
52	$15\times\frac{3}{8}$			5.9		11.7	28.56	1055	37.0	1.01	.1145	1124
53				6.3		12.0	28.98	1072	37.0	1.01	.1149	1147
54				7.2		12.8	30.00	1115	37.2	0.99	.1130	1204
55				8.2		13.5	31.02	1155	37.2	0.99	.1151	1261
56				9.2		14.2	32.04	1195	37.3	1.00	.1170	1318
57	$15\times\frac{7}{16}$			8.6		13.3	33.02	1194	36.2	1.00	.1190	1324
58				9.5		14.0	33.98	1231	36.2	1.00	.1192	1379
59	$15\times\frac{1}{2}$	$18\times\frac{7}{16}$		6.8		13.4	35.00	1255	35.9	0.99	.1120	1360
60				7.8		14.1	36.02	1296	36.0	1.00	.1138	1416
61	$15\times\frac{9}{16}$			7.2		13.2	36.99	1292	34.9	1.00	.1157	1421

62	15×$\frac{9}{16}$	18×$\frac{7}{16}$	3×3	8.1	3×4	13.9	37.95	1331	35.1	1.00	.1159	1475
63	15×$\frac{5}{8}$			7.5		13.1	38.99	1332	34.2	0.99	.1159	1481
64				8.5		13.8	40.01	1373	34.3	0.99	.1175	1538
65	15×$\frac{11}{16}$	18×$\frac{1}{2}$		5.9		13.2	41.09	1397	34.0	1.00	.1124	1519
66				6.8		13.9	42.05	1436	34.1	1.00	.1127	1573
67				7.8		14.6	43.07	1477	34.3	1.00	.1142	1629
68	15×$\frac{3}{4}$			7.1		13.7	43.98	1472	33.5	1.00	.1146	1626
69				8.1		14.4	45.00	1512	33.6	1.00	.1160	1683
70	16×$\frac{7}{16}$	16×$\frac{7}{16}$	3×3	5.9	3×4	10.3	30.72	1230	40.0	1.25	.1419	851
71				6.2		10.5	31.02	1245	40.1	1.25	.1425	863
72				7.2		11.2	32.04	1292	40.3	1.25	.1436	905
73				8.1		11.9	33.00	1338	40.5	1.24	.1430	945
74				9.1		12.6	34.02	1385	40.7	1.24	.1440	988
75				10.1		13.2	34.98	1427	40.8	1.25	.1469	1029
76				11.1		13.9	36.00	1472	40.9	1.25	.1478	1074
77	16×$\frac{1}{4}$	18×$\frac{1}{4}$	3×3	5.9	3×4	8.3	21.02	883	42.0	1.23	.1456	839
78				6.9		8.9	21.98	927	42.2	1.25	.1501	891
79		18×$\frac{5}{16}$		5.9		9.8	23.05	1001	43.4	1.25	.1427	922
80				6.8		10.5	24.01	1048	43.6	1.24	.1420	974
81	16×$\frac{5}{16}$			5.9		9.3	24.75	1026	41.5	1.25	.1450	970
82				7.2		10.2	26.07	1088	41.8	1.25	.1469	1042
83		18×$\frac{3}{8}$		5.9		11.0	26.89	1151	42.8	1.24	.1372	1061
84				6.8		11.6	27.79	1193	42.9	1.25	.1393	1109
85	16×$\frac{3}{8}$			5.9		10.5	28.59	1177	41.2	1.24	.1396	1106
86				6.4		10.7	29.01	1195	41.2	1.26	.1437	1129
87				7.3		11.4	29.97	1241	41.4	1.25	.1431	1182

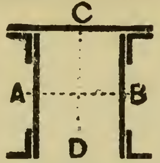
THREE PLATES. FOUR ANGLES.



	Two Web Plates. Size in inches.	Top Plate. Size in inches.	TOP ANGLE.		BOTTOM ANGLE.		Total Area, square inches.	AXIS A B.		Excen-tricity.	$\frac{T-B}{A}$	AXIS C D.
			Size in inches.	Lbs. per ft.	Size in inches.	Lbs. per ft.		I	r^2			I
88	$16\times\frac{3}{8}$	$18\times\frac{3}{8}$	3×3	8.3	3×4	12.1	30.99	1289	41.6	1.25	.1443	1237
89				9.3		12.8	32.01	1335	41.7	1.25	.1453	1295
90	$16\times\frac{7}{16}$	$18\times\frac{7}{16}$		6.6		12.0	33.04	1355	41.0	1.26	.1404	1274
91				7.5		12.7	34.00	1400	41.2	1.25	.1400	1328
92				7.9		13.0	34.42	1421	41.3	1.24	.1400	1351
93		$18\times\frac{1}{2}$		6.4		13.6	35.00	1472	42.0	1.25	.1337	1358
94				7.4		14.3	36.02	1520	42.2	1.25	.1349	1413
95	$16\times\frac{1}{2}$			5.9		12.7	36.16	1472	40.7	1.25	.1361	1370
96				6.7		13.3	37.00	1512	40.9	1.25	.1362	1416
97				7.7		14.0	38.02	1559	41.0	1.25	.1373	1473
98				8.7		14.7	39.04	1605	41.1	1.25	.1383	1531
99	$16\times\frac{5}{8}$			6.3		12.0	39.98	1544	38.6	1.25	.1396	1475
100				7.1		12.5	40.76	1580	38.8	1.25	.1413	1517
101				7.3		12.7	41.00	1591	38.8	1.25	.1405	1532
102				8.3		13.4	42.02	1638	39.0	1.25	.1414	1589
103				9.3		14.1	43.04	1685	39.1	1.25	.1422	1646
104	$16\times\frac{11}{16}$			8.6		13.1	44.02	1679	38.2	1.25	.1431	1643
105				8.8		13.2	44.20	1687	38.2	1.25	.1439	1653

106	16×11/16	18×½	3×3	9.6	3×4	13.8	45.04	1725	38.3	1.25	.1439	1700
107	16×¾			8.9		12.8	46.02	1718	37.3	1.25	.1447	1697
108				9.9		13.4	46.98	1760	37.5	1.25	.1469	1752
109				10.9		14.1	48.00	1806	37.6	1.25	.1475	1810
110	18×½	21×½	3×3	5.9	3×4	13.5	40.14	2068	51.5	1.50	.1480	2239
111				6.7		14.1	40.98	2120	51.7	1.50	.1479	2305
112				8.1		15.1	42 42	2208	52.1	1.49	.1485	2420
113	18×9/16			7.7		14.2	43.89	2216	50.5	1.50	.1504	2465
114				8.8		14.9	44.97	2280	50.7	1.50	.1521	2552
115				9.3		15.3	45 51	2311	50.8	1.50	.1516	2597
116	18×⅝	21×9/16		6.3		14.5	46.79	2346	50.1	1.50	.1473	2574
117				7.3		15.2	47.81	2407	50.3	1.50	.1479	2656
118				7.8		15.5	48.29	2437	50.5	1.50	.1489	2693
119				8.3		15.9	48.83	2467	50.5	1.50	.1485	2739
120		21×⅝		6.0		16.2	48.95	2512	51 3	1.50	.1432	2699
121				6 2		16.4	49.19	2526	51 3	1.50	.1425	2720
122	18×11/16			5.9		15.5	50.72	2541	50.1	1.50	.1453	2761
123				7.1		16.4	51.98	2615	50 3	1.50	.1453	2864
124	18×¾			6.3		15.2	53.03	2600	49.0	1.50	.1469	2867
125				7.3		15.9	54 05	2660	49.2	1.50	.1475	2950
126				8.3		16.6	55.07	2721	49.4	1.50	.1480	3032
127	20×5/16	18×⅜	3×3	5.9	3×4	10.5	29.09	1886	64.8	1.49	.1372	1128
128				6.8		11.1	29.99	1956	65.2	1.50	.1390	1176
129				7.8		11.8	31.01	2036	65.6	1.50	.1403	1232
130				8.8		12 5	32.03	2113	66.0	1.50	.1414	1289
131				9.7		13.2	32.99	2186	66.3	1.49	.1409	1344

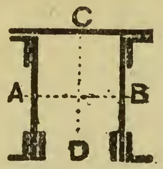
THREE PLATES. FOUR ANGLES.



	Two Web Plates. Size in inches.	Top Plate. Size in inches.	TOP ANGLE.		BOTTOM ANGLE.		Total Area, square inches.	AXIS A B.		Excen-tricity.	$\frac{T-B}{A}$	AXIS C D.
			Size in inches.	Lbs. per ft.	Size in inches.	Lbs. per ft.		I	r²			I
132	20×3/8	18×3/8	3×3	8.6	3×4	11.8	33.99	2150	63.3	1.50	.1421	1337
133				9.6		12.5	35.01	2227	63.6	1.51	.1431	1394
134				10.5		13.2	35.97	2299	63.9	1.50	.1426	
135	20×7/16	18×7/16		6.5		11.2	36.00	2218	61.6	1.51	.1404	
136				7.4		11.9	36.96	2294	62.1	1.50	.1400	
137				8.4		12.6	37.98	2373	62.5	1.51	.1410	
138				9.4		13.3	39.00	2450	62.8	1.51	.1419	
139				10.3		14.0	39.96	2524	63.2	1.50	.1415	
140	20×1/2	18×1/2		6.3		12.1	40.04	2450	61.2	1.51	.1379	
141				7.2		12.8	41.00	2525	61.6	1.50	.1376	
142				8.1		13.5	41.96	2599	61.9	1.50	.1373	
143				9.1		14.2	42.98	2677	62.3	1.50	.1382	
144	20×9/16	18×9/16		6.0		13.0	44.03	2679	60.8	1.50	.1346	
145				7.0		13.7	45.05	2757	61.2	1.50	.1355	
146				8.0		14.4	46.07	2835	61.5	1.50	.1364	
147	20×5/8			6.8		13.0	47.01	2796	59.5	1.49	.1362	
148				7.8		13.7	48.03	2873	59.8	1.50	.1371	
149				8.8		14.4	49.05	2949	60.1	1.50	.1379	

150	20×$\frac{11}{16}$	18×$\frac{9}{16}$	3×3	7.7	3×4	13.0	50.05	2914	58.2	1.50	.1388	
151				8.7		13.7	51.07	2991	58.6	1.50	.1395	
152				9.7		14.4	52.09	3068	58.9	1.50	.1402	
153	20×¾	18×⅝		6.5		13.2	53.07	3067	57.8	1.50	.1362	
154				7.5		13.9	54.09	3145	58.1	1.50	.1370	1945
155	20×½	24×⅜	4×4	9.5	4×6	20.0	46.70	2813	60.2	1.00	.0578	3120
156				10.6		21.0	47.96	2898	60.4	1.00	.0575	
157				11.5		21.8	48.98	2968	60.6	1.00	.0576	
158				12.4		22.6	50.00	3037	60.7	1.00	.0576	
159	20×$\frac{9}{16}$			11.3		21.2	51.00	3017	59.2	1.00	.0600	
160		24×$\frac{7}{16}$		9.5		22.3	52.08	3137	60.2	1.00	.0541	3457
161	20×$\frac{9}{16}$	24×$\frac{7}{16}$	4×4	10.3	4×6	23.0	52.98	3198	60.4	1.00	.0544	
162				11.2		23.8	54.00	3265	60.5	1.00	.0544	
163	20×⅝			9.5		21.8	54.28	3200	59.0	1.00	.0575	3566
164				10.1		22.4	55.00	3249	59.1	1.00	.0567	
165				11.0		23.2	56.02	3319	59.2	1.00	.0568	
166				11.9		23.9	56.98	3384	59.4	1.00	.0579	
167	20×$\frac{11}{16}$	24×$\frac{7}{16}$	4×4	9.5	4×6	21.3	56.48	3263	57.8	1.00	.0606	
168				10.8		22.5	57.98	3365	58.0	1.00	.0600	
169				11.7		23.3	59.00	3432	58.2	1.00	.0600	
170		24×½		9.5		24.1	59.66	3528	59.1	1.00	.0543	
171	20×¾			9.5		23.6	61.86	3589	58.0	1.00	.0572	4004
172				10.5		24.5	63.00	3665	58.2	1.00	.0571	
173	20×1¼	24×⅝	4×4	9.5	4×6	25.3	85.88	4626	53.9	1.00	.0643	5217

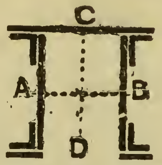
FIVE PLATES. FOUR ANGLES.



	Two Web Plates, Size in Inches.	Top Plate, Size in Inches.	TOP ANGLE.		BOTTOM ANGLE.		Flange Plates, Size in Inches.	Total Area Square Inches.	AXIS A B.		Eccentricity.	$\frac{T-B}{A}$	AXIS C D.
			Size in Inches.	Lbs. per Foot.	Size in Inches.	Lbs. per Foot.			I	r^2			I
1	18×½	21×½	3½×3½	8.0	3½×4	11.6	3½×½	43.76	2268	51.8	1.25	.1106	2141
2				8.2		11.7		43.94	2278	51.9	1.25	.1115	2153
3				9.3		12.5		45.08	2346	52.1	1.25	.1127	2235
4				10.2		13.2		46.04	2403	52.2	1.25	.1129	2306
5	18×½	21×9/16	3½×3½	8.7	3½×4	14.1	3½×½	46.99	2498	53.2	1.25	.1079	2331
6				9.6		14.8		47.95	2555	53.3	1.25	.1082	2400
7		21×⅝		8.1		15.8		48.97	2653	54.2	1.25	.1023	2432
8				9.1		16.5		49.99	2713	54.3	1.25	.1038	2507
9	18×½	21×⅝	3½×3½	10.0	3½×4	15.8	3½×⅝	50.98	2766	54.3	1.25	.1034	2543
10				11.0		16.5		52.00	2825	54.3	1.25	.1048	2619
11	18×9/16			10.1		15.3		52.99	2810	53.0	1.25	.1063	2615
12				11.1		16.0		54.01	2869	53.1	1.25	.1076	2691

13	18×⅝	21×⅝	3½×3½	10.2	3½×4	14.8	3½×⅝	55.00	2855	51.9	1.25	.1089	2685
14				11.1		15.5		55.96	2909	52.0	1.25	.1092	2756
15				12.1		16.2		56.98	2968	52.1	1.25	.1104	2830
16	18×$\frac{11}{16}$			11.2		15.0		57.97	2953	50.9	1.25	.1116	2824
17				11.4		15.2		58.21	2966	50.9	1.25	.1111	2842
18	18×$\frac{11}{16}$	21×⅝	3½×3½	13.1	3½×4	16.4	3½×⅝	59.95	3067	51.2	1.25	.1129	2970
19	18×¾			12.2		13.8	3½×¾	60.98	3049	50.0	1.25	.1135	2924
20				13.2		14.5		62.00	3107	50.1	1.25	.1145	2998
21				14.2		15.2		63.02	3165	50.2	1.25	.1155	3074
22	18×¾	21×⅝	3½×3½	15.1	3½×4	15.9	3½×¾	63.98	3220	50.3	1.25	.1157	3145
23				16.1		16.6		65.00	3277	50.4	1.25	.1166	3224
24	18×$\frac{13}{16}$			15.2		15.4		65.99	3262	49.4	1.25	.1176	3212
25				16.2		16.1		67.01	3320	49.6	1.25	.1185	3288
26	18×⅞	21×¾	3½×3½	10.3	3½×4	15.5	3½×¾	67.98	3398	50.0	1.25	.1086	3182
27				11.7		16.5		69.42	3482	50.2	1.25	.1098	3287
28	18×$\frac{15}{16}$			10.4		14.3	3½×$\frac{13}{16}$	70.01	3440	49.1	1.26	.1103	3224
29				11.3		15.1		71.03	3502	49.3	1.24	.1095	3299
30	18×$\frac{15}{16}$	21×¾	3½×3½	12.3	3½×4	15.8	3½×$\frac{13}{16}$	72.05	3558	49.4	1.25	.1105	3375
31	18×1			11.4		14.6		73.04	3543	48.5	1.25	.1114	3359
32				12.3		14.5	3½×⅞	73.96	3594	48.6	1.25	.1122	3405
33				13.3		15.2		74.98	3652	48.7	1.25	.1131	3480
34				14.3		15.9		76.00	3711	48.8	1.25	.1139	3555

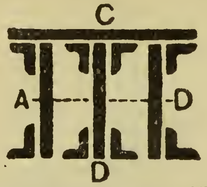
FIVE PLATES. FOUR ANGLES.



	Two Web Plates, Size in Inches.	Top Plate, Size in Inches.	TOP ANGLE.		BOTTOM ANGLE.		Flange Plates, Size in Inches.	Total Area Square Inches.	AXIS A B.		Eccentricity.	$\frac{T-B}{A}$	AXIS C D.
			Size in Inches.	Lbs. per Foot.	Size in Inches.	Lbs. per Foot.			I	r^2			I
1	$20\times\frac{1}{2}$	$24\times\frac{1}{2}$	$3\frac{1}{2}\times3\frac{1}{2}$	8.0	$3\frac{1}{2}\times4$	12.2	$5\times\frac{1}{2}$	49.12	3396	69.1	1.00	.0912	3648
2				8.8		12.9		50.02	3464	69.2	1.00	.0908	3738
3				10.6		14.4		52.00	3615	69.5	0.99	.0908	3935
4		$24\times\frac{9}{16}$		8.0		14.7		52.12	3673	70.5	1.00	.0860	3876
5				9.7		16.1		53.98	3813	70.6	1.00	.0863	4064
6	$20\times\frac{9}{16}$	$24\times\frac{9}{16}$	$3\frac{1}{2}\times3\frac{1}{2}$	9.8	$3\frac{1}{2}\times4$	13.2	$5\times\frac{5}{8}$	56.05	3907	69.7	1.00	.0930	4179
7		$24\times\frac{5}{8}$		8.0		14.3		57.13	4041	70.7	0.99	.0870	4215
8				8.9		15.0		58.09	4112	70.8	1.00	.0876	4312
9				9.8		15.7		59.05	4183	70.8	1.00	.0882	4407
10	$20\times\frac{9}{16}$	$24\times\frac{11}{16}$	$3\frac{1}{2}\times3\frac{1}{2}$	8.0	$3\frac{1}{2}\times4$	15.5	$5\times\frac{11}{16}$	59.98	4334	72.2	1.00	.0862	4433
11				8.9		16.3		61.00	4411	72.3	0.99	.0849	4535
12				9.8		17.0		61.96	4482	72.4	1.00	.0855	4632
13	$20\times\frac{5}{8}$			8.0		15.0		62.18	4391	70.6	1.01	.0872	4549

14	20×⅝	24×11/16	3½×3½	8.7	3½×4	15.6	5×11/16	62.96	4452	70.7	1.00	.0870	4627
15				9.7		16.4		64.04	4532	70.8	1.00	.0874	4736
16				10.6		17.1		65.00	4604	70.8	1.01	.0880	4831
17	20×11/16			9.4		15.8		66.00	4572	69.3	1.00	.0876	4824
18	20×11/16	24×11/16	3½×3½	10.4	3½×4	16.5	5×11/16	67.02	4649	69.4	1.01	.0889	4928
19	20×¾			9.2		15.2		68.02	4617	67.9	1.00	.0885	4915
20				10.1		15.9		68.98	4691	68.0	1.00	.0890	5011
21				11.1		16.7		70.06	4770	68.1	1.00	.0894	5122
22				12.0		17.4		71.02	4842	68.2	1.00	.0898	5220
23	20×13/16			11.0		14.9	5×¾	72.04	4837	67.2	1.00	.0924	5209
24	20×13/16	24×11/16	3½×3½	11.9	3½×4	15.6	5×¾	73.00	4910	67.3	1.00	.0929	5306
25				12.8		16.3		73.96	4980	67.3	1.00	.0933	5402
26				13.7		17.1		74.98	5056	67.4	1.00	.0928	5537
27	20×⅞	24×¾		9.8		16.0		75.98	5084	66.9	1.00	.0892	5416
28				10.7		16.8		77.00	5159	67.0	1.00	.0888	5520
29	20×15/16	24×¾	3½×3½	9.9	3½×4	13.1	5×⅞	78.05	5184	66.4	1.00	.0939	5503
30				10.8		13.8		79.01	5258	66.5	1.00	.0943	5598
31				11.7		14.6		80.03	5334	66.6	1.00	.0938	5702
32				12.6		15.3		80.99	5405	66.7	1.00	.0942	5800
33				13.6		16.1		82.07	5484	66.8	1.00	.0944	5910
34	20×1			12.4		14.7		83.01	5450	65.7	1.00	.0948	5880
35				13.4		15.5		84.09	5529	65.8	1.00	.0950	5992

FOUR PLATES. EIGHT ANGLES.



	Three Web Plates, Size in Inches.	Top Plate, Size in Inches.	FOUR TOP ANGLES.		FOUR BOTTOM ANGLES.		Total Area Square Inches.	AXIS A B.		Eccentricity.	$\frac{T-B}{A}$	AXIS C D
			Size in Inches.	Lbs. per Foot.	Size in Inches.	Lbs. per Foot.		I	r^2			I
1	20 × ½	26 × $\frac{5}{16}$	3 × 3	5.9	3 × 4	8.3	55.16	3235	58.7	1.00	.0950	3448
2				6.3		8.6	56.00	3303	59.0	1.01	.0957	3502
3				6.8		9.0	57.08	3388	59.4	1.01	.0960	3574
4	20 × ½	26 × $\frac{5}{16}$	3 × 3 3½ × 3½	5.9 8.3	3 × 4 3½ × 4	8.3 10.2	57.74	3417	59.2	1.01	.0959	3656
5	20 × ½	26 × $\frac{5}{16}$	3½ × 3½	8.3	3½ × 4	10.3	60.44	3612	59.8	1.00	.0946	3484
6				8.5		10.5	60.92	3651	59.9	1.00	.0939	3512
7				9.0		10.9	62.00	3732	60.2	1.00	.0942	3581
8				9.5		11.3	63.08	3817	60.5	0.99	.0945	3646
9	20 × ½	26 × ⅜	3½ × 3½	8.3	3½ × 4	11.6	63.63	3904	61.4	1.00	.0910	3675
10				8.5		11.8	64.11	3943	61.5	1.00	.0903	3703
11				8.9		12.1	64.95	4005	61.7	1.00	.0910	3757
12				9.3		12.4	65.79	4068	61.8	1.01	.0917	3808
13				9.6		12.6	66.39	4115	62.0	1.01	.0926	3845
14				9.8		12.8	66.87	4153	62.1	1.00	.0920	3877
15				10.4		13.3	68.19	4254	62.4	1.00	.0919	3958
16				10.7		13.5	68.79	4295	62.4	1.01	.0929	3996

17	20 × ⅝	26 × ⅜	3½ × 3½	8.1	3½ × 4	10.8	69.93	4056	58.0	1.00	.0931	4002
18				8.3		11.0	70.41	4093	58.1	1.00	.0925	4030
19				8.6		11.2	71.01	4139	58.3	1.00	.0934	4067
20				9.0		11.6	71.97	4212	58.5	0.99	.0921	4128
21				9.5		11.9	72.93	4282	58.7	1.01	.0942	4188
22	20 × ⅝	26 × ⅜	3½ × 3½	10.0	3½ × 4	12.3	74.01	4369	59.0	1.00	.0944	4255
23				10.3		12.6	74.73	4423	59.2	0.99	.0935	4299
24				10.5		12.8	75.21	4462	59.3	0.99	.0929	4329
25				10.9		13.1	76.05	4522	59.5	0.99	.0935	4385
26				11.7		13.6	77.61	4638	59.8	1.01	.0963	4481
27				11.9		13.8	78.09	4676	59.9	1.00	.0957	4511
28				12.4		14.2	79.17	4756	60.1	1.00	.0959	4581
29				12.8		14.6	80.13	4828	60.3	0.99	.0947	4642
30				13.7		15.2	81.93	4956	60.5	1.01	.0970	4755
31				14.6		16.0	83.97	5111	60.9	0.99	.0961	4888
32	20 × ¾	26 × ½	3½ × 3½	8.5	3½ × 4	13.2	84.04	4907	58.4	0.99	.0876	4789
33				9.2		13.7	85.48	5015	58.7	1.00	.0889	4879
34				9.6		14.0	86.32	5078	58.8	1.00	.0894	4930
35				10.9		15.0	89.08	5282	59.3	1.01	.0907	5107
36				11.4		15.5	90.28	5375	59.5	0.99	.0895	5184
37				12.3		16.1	92.08	5506	59.8	1.01	.0917	5298
38				13.5		17.2	94.84	5709	60.2	0.99	.0903	5478
39	20 × ⅞	26 × ½	3½ × 3½	11.0	3½ × 4	14.5	96.10	5492	57.1	1.00	.0916	5456
40				11.9		15.2	98.02	5633	57.5	1.00	.0922	5577
41				12.8		15.9	99.94	5777	57.8	1.00	.0929	5701
42				13.3		16.3	101.02	5856	58.0	1.00	.0930	5771

VALUES OF $\frac{L^2}{r^2}$

L=Length in Feet.
r=Radius of Gyration in Inches.

r^2 in Inches.	LENGTH IN FEET.										
	8	10	12	14	15	16	18	20	22	24	26
0.0											
0.1	640	1000	1440	1960							
0.2	320	500	720	980							
0.3	213	333	480	653	750						
0.4	160	250	360	490	562	640					
0.5	128	200	288	392	450	512	648				
0.6	107	167	240	327	375	427	540	667			
0.7	91	143	206	280	321	366	463	572	692		
0.8	80	125	180	245	281	320	405	500	605	720	
0.9	71	111	160	218	250	284	360	444	538	640	751
1.0	64	100	144	196	225	256	324	400	484	576	676
1.1	58	91	131	178	205	233	295	364	440	524	615
1.2	53	83	120	163	187	213	270	333	403	480	563
1.3	49	77	111	151	173	197	249	308	372	443	520
1.4	46	71	103	140	161	183	231	286	346	411	483
1.5	43	67	96	131	150	171	216	267	323	384	451
1.6	40	62	90	122	141	160	202	250	302	360	422
1.7	38	59	85	115	132	151	191	235	285	339	398
1.8	36	56	80	109	125	142	180	222	269	320	376
1.9	34	53	76	103	118	135	171	211	255	303	356
2.0	32	50	72	98	112	128	162	200	242	288	338
2.1	30	48	69	93	107	122	154	191	231	274	322
2.2	29	45	65	89	102	116	147	182	220	262	307
2.3	28	43	63	85	98	112	141	174	210	250	294
2.4	27	42	60	82	94	107	135	167	202	240	282
2.5	26	40	58	78	90	102	130	160	194	230	270
2.6	25	38	55	75	87	98	125	154	186	222	260
2.7	24	37	53	73	83	95	120	148	179	213	250
2.8	23	36	51	70	80	91	116	143	173	206	241
2.9	22	34	50	68	78	88	112	138	167	199	233
3.0	21	33	48	65	75	85	108	133	161	192	225
3.1	21	32	46	63	73	83	105	129	156	186	218
3.2	20	31	45	61	70	80	101	125	151	180	211
3.3	19	30	44	59	68	78	98	121	147	175	205
3.4	19	29	42	58	66	75	95	118	142	169	199
3.5	18	29	41	56	64	73	93	114	138	165	193
3.6	18	28	40	54	62	71	90	111	134	160	188
3.7	17	27	39	53	61	69	88	108	131	156	183
3.8	17	26	38	52	59	67	85	105	127	152	178
3.9	16	26	37	50	58	66	83	103	124	148	173
4.0	16	25	36	49	56	64	81	100	121	144	169
4.1	16	24	35	48	55	62	79	98	118	141	165
4.2	15	24	34	47	54	61	77	95	115	137	161
4.3	15	23	34	46	52	60	75	93	113	134	157
4.4	15	23	33	45	51	58	74	91	110	131	154

VALUES OF $\frac{L^2}{r^2}$

L=Length in Feet.
r=Radius of Gyration in Inches.

LENGTH IN FEET.												r^2 in Inches.
28	30	32	34	36	38	40	42	44	46	48	50	
												0.0
												0.1
												0.2
												0.3
												0.4
												0.5
												0.6
												0.7
												0.8
												0.9
784												1.0
713	818											1.1
653	750	853										1.2
603	692	788	889									1.3
560	643	731	826	926								1.4
523	600	683	771	864	963							1.5
490	562	640	723	810	903							1.6
461	529	602	680	762	849	941						1.7
436	500	569	642	720	802	889	980					1.8
413	474	539	608	682	760	842	928					1.9
392	450	512	578	648	722	800	882	968				2.0
373	429	488	551	617	688	762	840	922				2.1
356	409	466	526	589	656	727	802	880	962			2.2
341	391	445	503	564	628	696	767	842	920			2.3
327	375	427	482	540	602	667	735	807	882	960		2.4
314	360	410	462	518	578	640	706	774	846	922		2.5
302	346	394	445	498	555	615	678	745	814	886	962	2.6
290	333	379	428	480	535	593	653	717	784	853	926	2.7
280	321	366	413	463	516	571	630	691	756	823	893	2.8
270	310	353	399	447	498	552	608	668	730	795	862	2.9
261	300	341	385	432	481	533	588	645	705	768	833	3.0
253	290	330	373	418	466	516	569	625	683	743	806	3.1
245	281	320	361	405	451	500	551	605	661	720	781	3.2
238	273	310	350	393	438	485	535	587	641	698	758	3.3
231	265	301	340	381	425	471	519	569	622	678	735	3.4
224	257	293	330	370	413	457	504	553	605	658	714	3.5
218	250	284	321	360	401	444	490	538	588	640	695	3.6
212	243	277	312	350	390	433	477	523	572	623	676	3.7
206	237	269	304	341	380	421	464	509	557	606	658	3.8
201	231	263	296	332	370	410	452	496	543	591	641	3.9
196	225	256	289	324	361	400	441	484	529	576	625	4.0
191	220	250	282	316	352	390	430	472	516	562	610	4.1
187	214	244	275	309	344	381	420	461	504	549	595	4.2
182	209	238	269	301	336	372	410	450	492	536	581	4.3
178	205	233	263	295	328	364	401	440	481	524	568	4.4

VALUES OF $\frac{L^2}{r^2}$

L=Length in Feet.
r=Radius of Gyration in Inches.

r^2 in Inches.	LENGTH IN FEET.										
	8	10	12	14	15	16	18	20	22	24	26
4.5	14	22	32	44	50	57	72	89	108	128	150
4.6	14	22	31	43	49	56	70	87	105	125	147
4.7	14	21	31	42	48	55	69	85	103	123	144
4.8	13	21	30	41	47	53	67	83	101	120	141
4.9	13	20	29	40	46	52	66	82	99	118	138
5.0	13	20	29	39	45	51	65	80	97	115	135
5.1	13	20	28	38	44	50	64	78	95	113	133
5.2	12	19	28	38	43	49	62	77	93	111	130
5.3	12	19	27	37	42	48	61	75	91	109	128
5.4	12	19	27	36	42	47	60	74	90	107	125
5.5	12	18	26	36	41	47	59	73	88	105	123
5.6	11	18	26	35	40	46	58	71	86	103	121
5.7	11	18	25	34	39	45	57	70	85	101	119
5.8	11	17	25	34	39	44	56	69	83	99	117
5.9	11	17	24	33	38	43	55	68	82	98	115
6.0	11	17	24	33	37	43	54	67	81	96	113
6.1	10	16	24	32	37	42	53	66	79	94	111
6.2	10	16	23	32	36	41	52	65	78	63	109
6.3	10	16	23	31	36	41	51	63	77	91	107
6.4	10	16	23	31	35	40	51	62	76	90	106
6.5	10	15	22	30	35	39	50	62	74	89	104
6.6	10	15	22	30	34	39	49	61	73	87	102
6.7	10	15	21	29	34	38	48	60	72	86	101
6.8	9	15	21	29	33	38	48	59	71	85	99
6.9	9	14	21	28	33	37	47	58	70	83	98
7.0	9	14	21	28	32	37	46	57	69	82	97
7.1	9	14	20	28	32	36	46	56	68	81	95
7.2	9	14	20	27	31	36	45	56	67	80	94
7.3	9	14	20	27	31	35	44	55	66	79	93
7.4	9	14	19	26	30	35	44	54	65	78	91
7.5	9	13	19	26	30	34	43	53	65	77	90
7.6	8	13	19	26	30	34	43	53	64	76	89
7.7	8	13	19	25	29	33	42	52	63	75	88
7.8	8	13	18	25	29	33	42	51	62	74	87
7.9	8	13	18	25	28	32	41	51	61	73	86
8.0	8	12	18	25	28	32	41	50	61	72	85
8.1	8	12	18	24	28	32	40	49	60	71	83
8.2	8	12	18	24	27	31	40	49	59	70	82
8.3	8	12	17	24	27	31	39	48	58	69	81
8.4	8	12	17	23	27	30	39	48	58	69	80
8.5	8	12	17	23	26	30	38	47	57	68	80
8.6	7	12	17	23	26	30	38	47	56	67	79
8.7	7	11	17	23	26	29	37	46	56	66	78
8.8	7	11	16	22	26	29	37	45	55	65	77
8.9	7	11	16	22	25	29	36	45	54	65	76

VALUES OF $\frac{L^2}{r^2}$

L=Length in Feet.
r=Radius of Gyration in Inches.

LENGTH IN FEET.												r^2 in Inches.
28	30	32	34	36	38	40	42	44	46	48	50	
174	200	228	257	288	321	356	392	430	470	512	556	4.5
170	196	223	251	282	314	348	384	421	460	501	544	4.6
167	192	218	246	276	307	340	375	412	450	490	532	4.7
163	188	213	241	270	301	333	368	403	441	480	521	4.8
160	184	209	236	265	295	327	360	395	432	470	510	4.9
157	180	205	231	259	289	320	353	387	423	461	500	5.0
154	176	201	227	254	283	314	346	380	415	452	490	5.1
151	173	197	222	249	278	308	339	372	407	443	481	5.2
148	170	193	218	245	273	302	333	365	399	435	472	5.3
145	167	190	214	240	267	296	327	359	392	427	463	5.4
143	164	186	210	236	263	291	321	352	385	419	455	5.5
140	161	183	206	231	258	286	315	346	378	411	446	5.6
138	158	180	203	227	253	281	309	340	371	404	439	5.7
135	155	177	199	223	249	276	304	334	365	397	431	5.8
133	153	174	196	220	245	271	299	328	359	391	424	5.9
131	150	171	193	216	241	267	294	323	353	384	417	6.0
129	148	168	190	212	237	262	289	317	347	378	410	6.1
126	145	165	186	209	233	258	285	312	341	372	403	6.2
124	143	163	184	206	229	254	280	307	336	366	397	6.3
123	141	160	181	203	226	250	276	303	331	360	391	6.4
121	138	158	178	199	222	246	271	298	326	355	385	6.5
119	136	155	175	196	219	242	267	293	321	349	379	6.6
117	134	153	173	193	216	239	263	289	316	344	373	6.7
115	132	151	170	191	212	235	259	285	311	339	368	6.8
114	130	148	168	188	209	232	256	281	307	334	362	6.9
112	129	146	165	185	206	229	252	277	302	329	357	7.0
110	127	144	163	183	203	225	248	273	298	325	352	7.1
109	125	142	161	180	201	222	245	269	294	320	347	7.2
107	123	140	158	178	198	219	242	265	290	316	342	7.3
106	122	138	156	175	195	216	238	262	286	311	338	7.4
105	120	137	154	173	193	213	235	258	282	307	333	7.5
103	118	135	152	171	190	211	232	255	278	303	329	7.6
102	117	133	150	168	188	208	229	251	275	299	325	7.7
101	115	131	148	166	185	205	226	248	271	295	321	7.8
99	114	130	146	164	183	203	223	245	268	292	316	7.9
98	113	128	145	162	182	200	221	242	265	288	313	8.0
97	111	126	143	160	178	198	218	239	261	284	309	8.1
96	110	125	141	158	176	195	215	236	258	281	305	8.2
94	108	123	139	156	174	193	213	233	255	278	301	8.3
93	107	122	138	154	172	191	210	230	252	274	298	8.4
92	106	120	136	152	170	188	208	228	249	271	294	8.5
91	105	119	134	151	168	186	205	225	246	268	291	8.6
90	103	118	133	149	166	184	203	223	243	265	287	8.7
89	102	116	131	147	164	182	200	220	240	262	284	8.8
88	101	115	130	146	162	180	198	218	238	259	281	8.9

VALUES OF $\frac{L^2}{r^2}$

L=Length in Feet.
r=Radius of Gyration in Inches.

r^2 in Inches.	LENGTH IN FEET.										
	8	10	12	14	15	16	18	20	22	24	26
9.0	7	11	16	22	25	28	36	44	54	64	75
9.1	7	11	16	22	25	28	36	44	53	63	74
9.2	7	11	16	21	24	28	35	43	53	63	73
9.3	7	11	15	21	24	28	35	43	52	62	73
9.4	7	11	15	21	24	27	34	43	52	61	72
9.5	7	11	15	21	24	27	34	42	51	61	71
9.6	7	10	15	20	23	27	34	42	50	60	70
9.7	7	10	15	20	23	26	33	41	50	59	70
9.8	7	10	15	20	23	26	33	41	49	59	69
9.9	6	10	15	20	23	26	33	40	49	58	68
10.0	6	10	14	20	23	26	32	40	48	58	68
10.1	6	10	14	19	22	25	32	40	48	57	67
10.2	6	10	14	19	22	25	32	39	47	56	66
10.3	6	10	14	19	22	25	31	39	47	56	66
10.4	6	10	14	19	22	25	31	38	47	55	65
10.5	6	10	14	19	21	24	31	38	46	55	64
10.6	6	9	14	18	21	24	31	38	46	54	64
10.7	6	9	13	18	21	24	30	37	45	54	63
10.8	6	9	13	18	21	24	30	37	45	53	63
10.9	6	9	13	18	21	23	30	37	44	53	62
11.0	6	9	13	18	20	23	29	36	44	52	61
11.1	6	9	13	18	20	23	29	36	44	52	61
11.2	6	9	13	18	20	23	29	36	43	51	60
11.3	6	9	13	17	20	23	29	35	43	51	60
11.4	6	9	13	17	20	22	28	35	42	51	59
11.5	6	9	13	17	20	22	28	35	42	50	59
11.6	6	9	12	17	19	22	28	34	42	50	58
11.7	5	9	12	17	19	22	28	34	41	49	58
11.8	5	8	12	17	19	22	27	34	41	49	57
11.9	5	8	12	16	19	22	27	34	41	48	57
12.0	5	8	12	16	19	21	27	33	40	48	56
12.5	5	8	12	16	18	20	26	32	39	46	54
13.0	5	8	11	15	17	20	25	31	37	44	52
13.5	5	7	11	15	17	19	24	30	36	43	50
14.0	5	7	10	14	16	18	23	29	35	41	48
14.5	4	7	10	14	16	18	22	28	33	40	47
15.0	4	7	10	13	15	17	22	27	32	38	45
15.5	4	6	9	13	15	17	21	26	31	37	44
16.0	4	6	9	12	14	16	20	25	30	36	42
16.5	4	6	9	12	14	16	20	24	29	35	41
17.0	4	6	8	12	13	15	19	24	28	34	40
17.5	4	6	8	11	13	15	19	23	28	33	39
18.0	4	6	8	11	13	14	18	22	27	32	38
18.5	3	5	8	11	12	14	18	22	26	31	37
19.0	3	5	8	10	12	13	17	21	25	30	36

VALUES OF $\frac{L^2}{r^2}$

L=Length in Feet.
r=Radius of Gyration in Inches.

LENGTH IN FEET.												r^2 in Inches.
28	30	32	34	36	38	40	42	44	46	48	50	
87	100	114	128	144	160	178	196	215	235	256	278	9.0
86	99	113	127	142	159	176	194	213	233	253	275	9.1
85	98	111	126	141	157	174	192	210	230	250	272	9.2
84	97	110	124	139	155	172	190	208	228	248	269	9.3
83	96	109	123	138	154	170	188	206	225	245	266	9.4
83	95	108	122	136	152	168	186	204	223	243	263	9.5
82	94	107	120	135	150	167	184	202	220	240	260	9.6
81	93	106	119	134	149	165	182	200	218	238	258	9.7
80	92	104	118	132	147	163	180	198	216	235	255	9.8
79	91	103	117	131	146	162	178	196	214	233	253	9.9
78	90	102	116	130	144	160	176	194	212	230	250	10.0
78	89	101	114	128	143	158	175	192	210	228	248	10.1
77	88	100	113	127	142	157	173	190	207	226	245	10.2
76	87	99	112	126	140	155	171	188	205	224	243	10.3
75	87	98	111	125	139	154	170	186	203	222	240	10.4
75	86	98	110	123	138	152	168	184	202	219	238	10.5
74	85	97	109	122	136	151	166	183	200	217	236	10.6
73	84	96	108	121	135	150	165	181	198	215	234	10.7
73	83	95	107	120	134	148	163	179	196	213	231	10.8
72	83	94	106	119	132	147	162	178	194	211	229	10.9
71	82	93	105	118	131	145	160	176	192	209	227	11.0
71	81	92	104	117	130	144	159	174	191	208	225	11.1
70	80	91	103	116	129	143	157	173	189	206	223	11.2
69	80	91	102	115	128	142	156	171	187	204	221	11.3
69	79	90	101	114	127	140	155	170	186	202	219	11.4
68	78	89	101	113	126	139	153	168	184	200	217	11.5
68	78	88	100	112	124	138	152	167	182	199	216	11.6
67	77	88	99	111	123	137	151	165	181	197	214	11.7
66	76	87	98	110	122	136	149	164	179	195	212	11.8
66	76	86	97	109	121	134	148	163	178	194	210	11.9
65	75	85	96	108	120	133	147	161	176	192	208	12.0
63	72	82	92	104	116	128	141	155	169	184	200	12.5
60	69	79	89	100	111	123	136	149	163	177	192	13.0
58	67	76	86	96	107	119	131	143	157	171	185	13.5
56	64	73	83	93	103	114	126	138	151	165	179	14.0
54	62	71	80	89	100	110	122	134	146	159	172	14.5
52	60	68	77	86	96	107	118	129	141	154	167	15.0
51	58	66	75	84	93	103	114	125	137	149	161	15.5
49	56	64	72	81	90	100	110	121	132	144	156	16.0
48	55	62	70	79	88	97	107	117	128	140	152	16.5
46	53	60	68	76	85	94	104	114	124	136	147	17.0
45	51	59	66	74	83	91	101	111	121	132	143	17.5
44	50	57	64	72	80	89	98	108	118	128	139	18.0
42	49	55	62	70	78	86	95	105	114	125	135	18.5
41	47	54	61	68	76	84	93	102	111	121	132	19.0

VALUES OF $\frac{L^2}{r^2}$

L=Length in Feet.
r=Radius of Gyration in Inches.

r^2 in Inches.	LENGTH IN FEET.										
	8	10	12	14	15	16	18	20	22	24	26
19.5	3	5	7	10	12	13	17	21	25	30	35
20.0	3	5	7	10	11	13	16	20	24	29	34
20.5	3	5	7	10	11	12	16	20	24	28	33
21.0	3	5	7	9	11	12	15	19	23	27	32
21.5	3	5	7	9	10	12	15	19	23	27	31
22.0	3	5	7	9	10	12	15	18	22	26	31
22.5	3	4	6	9	10	11	14	18	22	26	30
23.0	3	4	6	9	10	11	14	17	21	25	29
23.5	3	4	6	8	10	11	14	17	21	25	29
24.0	3	4	6	8	9	11	13	17	20	24	28
24.5	3	4	6	8	9	10	13	16	20	24	28
25.0	3	4	6	8	9	10	13	16	19	23	27
25.5	3	4	6	8	9	10	13	16	19	23	27
26.0	2	4	6	8	9	10	12	15	19	22	26
26.5	2	4	5	7	8	10	12	15	18	22	26
27.0	2	4	5	7	8	9	12	15	18	21	25
27.5	2	4	5	7	8	9	12	15	18	21	25
28.0	2	4	5	7	8	9	12	14	17	21	24
28.5	2	4	5	7	8	9	11	14	17	20	24
29.0	2	3	5	7	8	9	11	14	17	20	23
29.5	2	3	5	7	8	9	11	14	16	20	23
30.0	2	3	5	7	8	9	11	13	16	19	23
30.5	2	3	5	6	7	8	11	13	16	19	22
31.0	2	3	5	6	7	8	10	13	16	19	22
31.5	2	3	5	6	7	8	10	13	15	18	21
32.0	2	3	5	6	7	8	10	13	15	18	21
32.5	2	3	4	6	7	8	10	12	15	18	21
33.0	2	3	4	6	7	8	10	12	15	17	20
33.5	2	3	4	6	7	8	10	12	14	17	20
34.0	2	3	4	6	7	8	10	12	14	17	20
34.5	2	3	4	6	7	7	9	12	14	17	20
35.0	2	3	4	6	6	7	9	11	14	16	19
35.5	2	3	4	6	6	7	9	11	14	16	19
36.0	2	3	4	5	6	7	9	11	13	16	19
36.5	2	3	4	5	6	7	9	11	13	16	19
37.0	2	3	4	5	6	7	9	11	13	16	18
37.5	2	3	4	5	6	7	9	11	13	15	18
38.0	2	3	4	5	6	7	9	11	13	15	18
38.5	2	3	4	5	6	7	8	10	13	15	18
39.0	2	3	4	5	6	7	8	10	12	15	17
39.5	2	3	4	5	6	6	8	10	12	15	17
40.0	2	3	4	5	6	6	8	10	12	14	17
40.5	2	2	4	5	6	6	8	10	12	14	17
41.0	2	2	4	5	5	6	8	10	12	14	16
41.5	2	2	3	5	5	6	8	10	12	14	16

VALUES OF $\frac{L^2}{r^2}$

L=Length in Feet.
r=Radius of Gyration in Inches.

LENGTH IN FEET.												r^2 in Inches.
28	30	32	34	36	38	40	42	44	46	48	50	
40	46	53	59	66	74	82	90	99	109	118	128	19.5
39	45	51	58	65	72	80	88	97	106	115	125	20.0
38	44	50	56	63	70	78	86	94	103	112	122	20.5
37	43	49	55	62	69	76	84	92	101	110	119	21.0
36	42	48	54	60	67	74	82	90	98	107	116	21.5
36	41	47	53	59	66	73	80	88	96	105	114	22.0
35	40	46	51	58	64	71	78	86	94	102	111	22.5
34	39	45	50	56	63	70	77	84	92	100	109	23.0
33	38	44	49	55	61	68	75	82	90	98	106	23.5
33	38	43	48	54	60	67	74	81	88	96	104	24.0
32	37	42	47	53	59	65	72	79	86	94	102	24.5
31	36	41	46	52	58	64	71	77	85	92	100	25.0
31	35	40	45	51	57	63	69	76	83	90	98	25.5
30	35	39	44	50	56	62	68	74	81	89	96	26.0
30	34	39	44	49	54	60	67	73	80	87	94	26.5
29	33	38	43	48	53	59	65	72	78	85	93	27.0
29	33	37	42	47	53	58	64	70	77	84	91	27.5
28	32	37	41	46	52	57	63	69	76	82	89	28.0
28	32	36	41	45	51	56	62	68	74	81	88	28.5
27	31	35	40	45	50	55	61	67	73	79	86	29.0
27	31	35	39	44	49	54	60	66	72	78	85	29.5
26	30	34	39	43	48	53	59	65	71	77	83	30.0
26	30	34	38	42	47	52	58	63	69	76	82	30.5
25	29	33	37	42	47	52	57	62	68	74	81	31.0
25	29	33	37	41	46	51	56	61	67	73	79	31.5
25	28	32	36	41	45	50	55	61	66	72	78	32.0
24	28	32	36	40	44	49	54	60	65	71	77	32.5
24	27	31	35	39	44	48	53	59	64	70	76	33.0
23	27	31	35	39	43	48	53	58	63	69	75	33.5
23	26	30	34	38	42	47	52	57	62	68	74	34.0
23	26	30	34	38	42	46	51	56	61	67	72	34.5
22	26	29	33	37	41	46	50	55	60	66	71	35.0
22	25	29	33	37	41	45	50	55	60	65	70	35.5
22	25	28	32	36	40	44	49	54	59	64	69	36.0
21	25	28	32	36	40	44	48	53	58	63	69	36.5
21	24	28	31	35	39	43	48	52	57	62	68	37.0
21	24	27	31	35	39	43	47	52	56	61	67	37.5
21	24	27	30	34	38	42	46	51	56	61	66	38.0
20	23	27	30	34	38	42	46	50	55	60	65	38.5
20	23	26	30	33	37	41	45	50	54	59	64	39.0
20	23	26	29	33	37	41	45	49	54	58	63	39.5
20	23	26	29	32	36	40	44	48	53	58	63	40.0
19	22	25	29	32	36	40	44	48	52	57	62	40.5
19	22	25	28	32	35	39	43	47	52	56	61	41.0
19	22	25	28	31	35	39	43	47	51	56	60	41.5

VALUES OF $\frac{L^2}{r^2}$

L=Length in Feet.
r=Radius of Gyration in Inches.

r^2 in Inches.	LENGTH IN FEET.										
	8	10	12	14	15	16	18	20	22	24	26
42.0	2	2	3	5	5	6	8	10	12	14	16
42.5	2	2	3	5	5	6	8	9	11	14	16
43.0	1	2	3	5	5	6	8	9	11	13	16
43.5	1	2	3	5	5	6	7	9	11	13	16
44.0	1	2	3	4	5	6	7	9	11	13	15
44.5	1	2	3	4	5	6	7	9	11	13	15
45.0	1	2	3	4	5	6	7	9	11	13	15
45.5	1	2	3	4	5	6	7	9	11	13	15
46.0	1	2	3	4	5	5	7	9	11	13	15
46.5	1	2	3	4	5	5	7	9	10	12	15
47.0	1	2	3	4	5	5	7	9	10	12	14
47.5	1	2	3	4	5	5	7	8	10	12	14
48.0	1	2	3	4	5	5	7	8	10	12	14
48.5	1	2	3	4	5	5	7	8	10	12	14
49.0	1	2	3	4	5	5	7	8	10	12	14
49.5	1	2	3	4	5	5	7	8	9	12	14
50.0	1	2	3	4	5	5	6	8	9	12	14
50.5	1	2	3	4	5	5	6	8	9	11	13
51.0	1	2	3	4	4	5	6	8	9	11	13
51.5	1	2	3	4	4	5	6	8	9	11	13
52.0	1	2	3	4	4	5	6	8	9	11	13
52.5	1	2	3	4	4	5	6	8	9	11	13
53.0	1	2	3	4	4	5	6	8	9	11	13
53.5	1	2	3	4	4	5	6	7	9	11	13
54.0	1	2	3	4	4	5	6	7	9	11	13
54.5	1	2	3	4	4	5	6	7	9	11	12
55.0	1	2	3	4	4	5	6	7	9	10	12
55.5	1	2	3	4	4	5	6	7	9	10	12
56.0	1	2	3	3	4	5	6	7	9	10	12
56.5	1	2	3	3	4	5	6	7	9	10	12
57.0	1	2	3	3	4	4	6	7	8	10	12
57.5	1	2	3	3	4	4	6	7	8	10	12
58.0	1	2	2	3	4	4	6	7	8	10	12
58.5	1	2	2	3	4	4	6	7	8	10	12
59.0	1	2	2	3	4	4	5	7	8	10	11
59.5	1	2	2	3	4	4	5	7	8	10	11
60.0	1	2	2	3	4	4	5	7	8	10	11
60.5	1	2	2	3	4	4	5	7	8	10	11
61.0	1	2	2	3	4	4	5	7	8	9	11
61.5	1	2	2	3	4	4	5	7	8	9	11
62.0	1	2	2	3	4	4	5	6	8	9	11
62.5	1	2	2	3	4	4	5	6	8	9	11
63.0	1	2	2	3	4	4	5	6	8	9	11
63.5	1	2	2	3	4	4	5	6	8	9	11
64.0	1	2	2	3	4	4	5	6	8	9	11

VALUES OF $\frac{L^2}{r^2}$

L=Length in Feet.
r=Radius of Gyration in Inches.

LENGTH IN FEET.												r^2 in Inches.
28	30	32	34	36	38	40	42	44	46	48	50	
19	21	24	28	31	34	38	42	46	50	55	60	42.0
18	21	24	27	30	34	38	42	46	50	54	59	42.5
18	21	24	27	30	34	37	41	45	49	54	58	43.0
18	21	24	27	30	33	37	41	45	49	53	57	43.5
18	20	23	26	29	33	36	40	44	48	52	57	44.0
18	20	23	26	29	32	36	40	44	48	52	56	44.5
17	20	23	26	29	32	36	39	43	47	51	56	45.0
17	20	23	25	28	32	35	39	43	47	51	55	45.5
17	20	22	25	28	31	35	38	42	46	50	54	46.0
17	19	22	25	28	31	34	38	42	45	50	54	46.5
17	19	22	25	28	31	34	38	41	45	49	53	47.0
17	19	22	24	27	30	34	37	41	45	49	53	47.5
16	19	21	24	27	30	33	37	40	44	48	52	48.0
16	19	21	24	27	30	33	36	40	44	48	52	48.5
16	18	21	24	26	29	33	36	40	43	47	51	49.0
16	18	21	23	26	29	32	36	39	43	47	51	49.5
16	18	20	23	26	29	32	35	39	42	46	50	50.0
16	18	20	23	26	29	32	35	38	42	46	50	50.5
15	18	20	23	25	28	31	35	38	41	45	49	51.0
15	17	20	22	25	28	31	34	38	41	45	49	51.5
15	17	20	22	25	28	31	34	37	41	44	48	52.0
15	17	20	22	25	28	30	34	37	40	44	48	52.5
15	17	19	22	24	27	30	33	37	40	43	47	53.0
15	17	19	22	24	27	30	33	36	40	43	47	53.5
15	17	19	21	24	27	30	33	36	39	43	46	54.0
14	17	19	21	24	26	29	32	36	39	42	46	54.5
14	16	19	21	24	26	29	32	35	38	42	45	55.0
14	16	18	21	23	26	29	32	35	38	42	45	55.5
14	16	18	21	23	26	29	31	35	38	41	45	56.0
14	16	18	20	23	26	28	31	34	37	41	44	56.5
14	16	18	20	23	25	28	31	34	37	40	44	57.0
14	16	18	20	23	25	28	31	34	37	40	43	57.5
14	16	18	20	22	25	28	30	33	36	40	43	58.0
13	15	18	20	22	25	27	30	33	36	39	43	58.5
13	15	17	20	22	24	27	30	33	36	39	42	59.0
13	15	17	19	22	24	27	30	33	36	39	42	59.5
13	15	17	19	22	24	27	29	32	35	38	42	60.0
13	15	17	19	21	24	26	29	32	35	38	41	60.5
13	15	17	19	21	24	26	29	32	35	38	41	61.0
13	15	17	19	21	23	26	29	31	34	37	41	61.5
13	15	17	19	21	23	26	28	31	34	37	40	62.0
13	14	16	18	21	23	26	28	31	34	37	40	62.5
12	14	16	18	21	23	25	28	31	34	37	40	63.0
12	14	16	18	20	23	25	28	30	33	36	39	63.5
12	14	16	18	20	23	25	28	30	33	36	39	64.0

VALUES OF $\frac{L^2}{r^2}$

L=Length in Feet.
r=Radius of Gyration in Inches.

r^2 in Inches.	LENGTH IN FEET.																			
	14	15	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50
64.5	3	3	4	5	6	8	9	10	12	14	16	18	20	22	25	27	30	33	36	39
65.0	3	3	4	5	6	7	9	10	12	14	16	18	20	22	25	27	30	33	35	38
65.5	3	3	4	5	6	7	9	10	12	14	16	18	20	22	24	27	30	32	35	38
66.0	3	3	4	5	6	7	9	10	12	14	16	18	20	22	24	27	29	32	35	38
66.5	3	3	4	5	6	7	9	10	12	14	15	17	19	22	24	27	29	32	35	38
67.0	3	3	4	5	6	7	9	10	12	13	15	17	19	22	24	26	29	32	34	37
67.5	3	3	4	5	6	7	9	10	12	13	15	17	19	21	24	26	29	31	34	37
68.0	3	3	4	5	6	7	8	10	12	13	15	17	19	21	24	26	28	31	34	37
68.5	3	3	4	5	6	7	8	10	11	13	15	17	19	21	23	26	28	31	34	36
69.0	3	3	4	5	6	7	8	10	11	13	15	17	19	21	23	26	28	31	33	36
69.5	3	3	4	5	6	7	8	10	11	13	15	17	19	21	23	25	28	30	33	35
70.0	3	3	4	5	6	7	8	10	11	13	15	17	19	21	23	25	28	30	33	36
70.5	3	3	4	5	6	7	8	10	11	13	15	16	18	20	23	25	27	30	33	35
71.0	3	3	4	5	6	7	8	10	11	13	14	16	18	20	23	25	27	30	32	35
71.5	3	3	4	5	6	7	8	9	11	13	14	16	18	20	22	25	27	30	32	35
72.0	3	3	4	5	6	7	8	9	11	13	14	16	18	20	22	25	27	29	32	35
73.0	3	3	4	4	5	7	8	9	11	12	14	16	18	20	22	24	27	29	32	34
74.0	3	3	3	4	5	7	8	9	11	12	14	16	18	20	22	24	26	29	31	34
75.0	3	3	3	4	5	6	8	9	10	12	14	15	17	19	21	24	26	28	31	33
76.0	3	3	3	4	5	6	8	9	10	12	13	15	17	19	21	23	25	28	30	33
77.0	3	3	3	4	5	6	7	9	10	12	13	15	17	19	21	23	25	27	30	32
78.0	2	3	3	4	5	6	7	9	10	12	13	15	17	19	21	23	25	27	30	32
79.0		3	3	4	5	6	7	9	10	11	13	15	16	18	20	22	25	27	29	32
80.0		3	3	4	5	6	7	8	10	11	13	14	16	18	20	22	24	26	29	31
81.0		3	3	4	5	6	7	8	10	11	13	14	16	18	20	22	24	26	28	31
82.0		3	3	4	5	6	7	8	10	11	12	14	16	18	20	22	24	26	28	30
84.0		3	3	4	5	6	7	8	9	11	12	14	15	17	19	21	23	25	27	30
86.0		3	3	4	5	6	7	8	9	10	12	13	15	17	19	21	23	25	27	29
88.0		3	3	4	5	6	7	8	9	10	12	13	15	16	18	20	22	24	26	28
90.0		3	3	4	4	5	6	8	9	10	11	13	14	16	18	20	22	24	26	28
92.0		2	3	4	4	5	6	7	9	10	11	13	14	16	17	19	21	23	25	27
94.0			3	3	4	5	6	7	8	10	11	12	14	15	17	19	21	23	25	27
96.0			3	3	4	5	6	7	8	9	11	12	14	15	17	18	20	22	24	26
98.0			3	3	4	5	6	7	8	9	10	12	13	15	16	18	20	22	24	26
100.0			3	3	4	5	6	7	8	9	10	12	13	14	16	18	19	21	23	26
102.0			3	3	4	5	6	7	8	9	10	11	13	14	16	17	19	21	23	25
104.0			2	3	4	5	6	7	7	9	10	11	12	14	15	17	19	20	22	24
106.0				3	4	5	5	6	7	8	10	11	12	14	15	17	18	20	22	24
108.0				3	4	4	5	6	7	8	9	11	12	13	15	16	18	20	21	23
110.0				3	4	4	5	6	7	8	9	11	12	13	15	16	18	19	21	23
112.0				3	4	4	5	6	7	8	9	10	12	13	14	16	17	19	21	22
114.0				3	4	4	5	6	7	8	9	10	11	13	14	15	17	19	20	22
116.0				3	3	4	5	6	7	8	9	10	11	12	14	15	17	18	20	22
118.0				3	3	4	5	6	7	8	9	10	11	12	14	15	16	18	20	21
120.0				3	3	4	5	6	7	8	9	10	11	12	13	15	16	18	19	21

ULTIMATE STRENGTH OF WROUGHT IRON COLUMNS.

For different proportions of length in feet (=L).
To least radius of gyration in inches (=r).

Square Bearing:	Pin and Square Bearing:	Pin Bearing:
$\dfrac{40000}{1 + .0036\,\dfrac{L^2}{r^2}}$	$\dfrac{40000}{1 + .0048\,\dfrac{L^2}{r^2}}$	$\dfrac{40000}{1 + .0072\,\dfrac{L^2}{r^2}}$

The above formulæ are usually written with length (=l) expressed in inches as follows:

$$\frac{40000}{1 + \dfrac{l^2}{40000\ r^2}} \qquad \frac{40000}{1 + \dfrac{l^2}{30000\ r^2}} \qquad \frac{40000}{1 + \dfrac{l^2}{20000\ r^2}}$$

To obtain Safe Resistance: } For quiescent loads, as in buildings, divide by 4.
For moving loads, as in bridges, divide by 5.

$\frac{L^2}{r^2}$	Ultimate Strength in Lbs. per square inch.			$\frac{L^2}{r^2}$	Ultimate Strength in Lbs. per square inch.		
	Square.	Pin and Square.	Pin.		Square.	Pin and Square.	Pin.
1	39857	39809	39714	21	37189	36337	34746
2	39714	39620	39432	22	37064	36179	34530
3	39573	39432	39154	23	36941	36023	34317
4	39432	39246	38880	24	36819	35868	34106
5	39293	39063	38610	25	36697	35714	33898
6	39154	38880	38344	26	36576	35562	33693
7	39017	38700	38081	27	36456	35411	33490
8	38880	38521	37821	28	36337	35261	33289
9	38745	38344	37566	29	36219	35112	33091
10	38610	38168	37313	30	36101	34965	32895
11	38476	37994	37064	31	35984	34819	32701
12	38344	37821	36819	32	35868	34674	32510
13	38212	37651	36576	33	35753	34530	32321
14	38081	37481	36337	34	35638	34388	32134
15	37951	37313	36101	35	35524	34247	31949
16	37821	37147	35868	36	35411	34106	31766
17	37693	36982	35638	37	35298	33967	31586
18	37566	36819	35411	38	35186	33829	31407
19	37439	36657	35186	39	35075	33693	31230
20	37313	36496	34965	40	34965	33557	31056

WROUGHT IRON COLUMNS—CONTINUED.

$\frac{L^2}{r^2}$	Ultimate Strength in Lbs. per square inch.			$\frac{L^2}{r^2}$	Ultimate Strength in Lbs. per square inch.		
	Square.	Pin and Square.	Pin.		Square.	Pin and Square.	Pin.
41	34855	33422	30883	81	30969	28802	25265
42	34746	33289	30713	82	30883	28703	25151
43	34638	33156	30544	83	30798	28604	25038
44	34530	33025	30377	84	30713	28506	24925
45	34423	32895	30211	85	30628	28409	24814
46	34317	32765	30048	86	30544	28313	24704
47	34211	32637	29886	87	30460	28217	24594
48	34106	32510	29727	88	30377	28121	24486
49	34002	32383	29568	89	30294	28027	24378
50	33898	32258	29412	90	30211	27933	24272
51	33795	32134	29257	91	30130	27840	24166
52	33693	32010	29104	92	30048	27747	24062
53	33591	31888	28952	93	29967	27655	23958
54	33490	31766	28802	94	29886	27563	23855
55	33389	31646	28653	95	29806	27472	23753
56	33289	31526	28506	96	29727	27382	23652
57	33190	31407	28361	97	29647	27293	23552
58	33091	31289	28217	98	29568	27203	23452
59	32992	31172	28074	99	29490	27115	23354
60	32895	31056	27933	100	29412	27027	23256
61	32798	30941	27793	101	29334	26940	23159
62	32701	30826	27655	102	29257	26853	23063
63	32605	30713	27518	103	29180	26767	22967
64	32510	30600	27382	104	29104	26681	22873
65	32415	30488	27248	105	29028	26596	22779
66	32321	30377	27115	106	28952	26511	22686
67	32227	30266	26983	107	28877	26427	22594
68	32134	30157	26853	108	28802	26344	22502
69	32041	30048	26724	109	28727	26261	22411
70	31949	29940	26596	110	28653	26178	22321
71	31857	29833	26469	111	28580	26096	22232
72	31766	29727	26344	112	28506	26015	22143
73	31676	29621	26219	113	28433	25934	22056
74	31586	29516	26096	114	28361	25853	21968
75	31496	29412	25974	115	28289	25773	21882
76	31407	29308	25853	116	28217	25694	21796
77	31319	29206	25733	117	28145	25615	21711
78	31230	29104	25615	118	28074	25536	21626
79	31143	29002	25497	119	28003	25458	21542
80	31056	28902	25381	120	27933	25381	21459

WROUGHT IRON COLUMNS—CONTINUED.

$\frac{L^2}{r^2}$	Ultimate Strength in Lbs. per square inch.			$\frac{L^2}{r^2}$	Ultimate Strength in Lbs. per square inch.		
	Square.	Pin and Square.	Pin.		Square.	Pin and Square.	Pin.
121	27863	25304	21377	205	23015	20161	16155
122	27793	25227	21295	210	22779	19920	15924
123	27724	25151	21213	215	22548	19685	15699
124	27655	25075	21133	220	22321	19455	15480
125	27586	25000	21053	225	22099	19231	15267
126	27518	24925	20973	230	21882	19011	15060
127	27450	24851	20894	235	21668	18797	14859
128	27382	24777	20816	240	21459	18587	14663
129	27315	24704	20738	245	21254	18382	14472
130	27248	24631	20661	250	21053	18182	14286
131	27181	24558	20585	255	20855	17986	14104
132	27115	24486	20509	260	20661	17794	13928
133	27049	24414	20433	265	20471	17606	13755
134	26983	24343	20358	270	20284	17422	13587
135	26918	24272	20284	275	20101	17241	13423
136	26853	24201	20210	280	19920	17065	13263
137	26788	24131	20137	285	19743	16892	13106
138	26724	24062	20064	290	19569	16722	12953
139	26660	23992	19992	295	19399	16556	12804
140	26596	23923	19920	300	19231	16393	12658
141	26532	23855	19849	310	18904	16077	12376
142	26469	23787	19778	320	18587	15773	12107
143	26406	23719	19708	330	18282	15480	11848
144	26344	23652	19639	340	17986	15198	11601
145	26281	23585	19569	350	17699	14925	11364
146	26219	23518	19501	360	17422	14663	11136
147	26157	23452	19433	370	17153	14409	10917
148	26096	23387	19365	380	16892	14164	10707
149	26035	23321	19298	390	16639	13928	10504
150	25974	23256	19231	400	16393	13699	10309
155	25674	22936	18904	410	16155	13477	10121
160	25381	22624	18587	420	15924	13263	9940
165	25094	22321	18282	430	15699	13055	9766
170	24814	22026	17986	440	15480	12853	9597
175	24540	21739	17699	450	15267	12658	9434
180	24272	21459	17422	460	15060	12469	9276
185	24010	21186	17153	470	14859	12285	9124
190	23753	20921	16892	480	14663	12107	8977
195	23502	20661	16639	490	14472	11933	8834
200	23256	20408	16393	500	14286	11765	8696

ULTIMATE STRENGTH OF WROUGHT IRON COLUMNS.

For different proportions of length in feet (=L).
To least radius of gyration in inches (=r).

Square Bearing:

$$\frac{40000}{1 + .004\,\frac{L^2}{r^2}}$$

Pin and Square Bearing:

$$\frac{40000}{1 + .006\,\frac{L^2}{r^2}}$$

Pin Bearing:

$$\frac{40000}{1 + .008\,\frac{L^2}{r^2}}$$

The above formulæ are usually written with length (=l) expressed in inches as follows:

$$\frac{40000}{1 + \frac{l^2}{36000\,r^2}} \qquad \frac{40000}{1 + \frac{l^2}{24000\,r^2}} \qquad \frac{40000}{1 + \frac{l^2}{18000\,r^2}}$$

To obtain Safe Resistance: } For quiescent loads, as in buildings, divide by 4.
For moving loads, as in bridges, divide by 5.

$\frac{L^2}{r^2}$	Ultimate Strength in Lbs. per square inch.			$\frac{L^2}{r^2}$	Ultimate Strength in Lbs. per square inch.		
	Square.	Pin and Square.	Pin.		Square.	Pin and Square.	Pin.
1	39841	39761	39683	21	36901	35524	34247
2	39683	39526	39370	22	36765	35336	34014
3	39526	39293	39063	23	36630	35149	33784
4	39370	39063	38760	24	36496	34965	33557
5	39216	38835	38462	25	36364	34783	33333
6	39062	38610	38168	26	36232	34602	33113
7	38910	38388	37879	27	36101	34423	32895
8	38759	38168	37594	28	35971	34247	32680
9	38610	37951	37313	29	35842	34072	32467
10	38462	37736	37037	30	35714	33898	32258
11	38315	37523	36765	31	35587	33727	32051
12	38168	37313	36496	32	35461	33557	31847
13	38023	37106	36232	33	35336	33389	31645
14	37879	36901	35971	34	35211	33223	31447
15	37736	36697	35714	35	35088	33058	31250
16	37594	36496	35461	36	34965	32895	31056
17	37453	36298	35211	37	34843	32733	30864
18	37313	36101	34965	38	34722	32573	30675
19	37175	35907	34722	39	34602	32415	30488
20	37037	35714	34483	40	34483	32258	30303

WROUGHT IRON COLUMNS—CONTINUED.

$\frac{L^2}{r^2}$	Ultimate Strength in Lbs. per square inch.			$\frac{L^2}{r^2}$	Ultimate Strength in Lbs. per square inch.		
	Square.	Pin and Square.	Pin.		Square.	Pin and Square.	Pin.
41	34364	32103	30121	81	30211	26918	24272
42	34247	31949	29940	82	30120	26809	24155
43	34130	31797	29762	83	30030	26702	24039
44	34014	31646	29586	84	29940	26596	23923
45	33898	31496	29412	85	29851	26490	23809
46	33784	31348	29240	86	29762	26385	23697
47	33670	31201	29070	87	29673	26281	23585
48	33556	31056	28902	88	29586	26178	23474
49	33445	30912	28736	89	29499	26076	23364
50	33333	30769	28571	90	29412	25974	23256
51	33223	30628	28409	91	29326	25873	23148
52	33113	30488	28248	92	29240	25773	23041
53	33003	30349	28090	93	29154	25674	22936
54	32895	30212	27933	94	29070	25575	22831
55	32787	30075	27778	95	28986	25478	22727
56	32680	29940	27624	96	28902	25381	22624
57	32573	29806	27472	97	28818	25284	22523
58	32468	29674	27322	98	28736	25189	22422
59	32363	29542	27174	99	28653	25094	22321
60	32258	29412	27027	100	28571	25000	22222
61	32154	29283	26882	101	28490	24907	22124
62	32051	29155	26738	102	28409	24814	22026
63	31949	29028	26596	103	28329	24722	21930
64	31848	28902	26455	104	28249	24631	21834
65	31746	28777	26316	105	28169	24540	21739
66	31646	28653	26178	106	28090	24450	21645
67	31546	28531	26042	107	28011	24360	21552
68	31447	28409	25907	108	27933	24272	21459
69	31348	28289	25773	109	27855	24184	21368
70	31250	28169	25641	110	27777	24096	21277
71	31152	28050	25510	111	27700	24009	21186
72	31055	27933	25381	112	27624	23923	21097
73	30959	27816	25253	113	27548	23838	21008
74	30864	27701	25126	114	27472	23753	20920
75	30769	27586	25000	115	27397	23669	20833
76	30675	27472	24876	116	27322	23585	20747
77	30581	27360	24752	117	27248	23502	20661
78	30488	27248	24631	118	27174	23419	20576
79	30395	27137	24510	119	27100	23337	20492
80	30303	27027	24390	120	27027	23256	20408

WROUGHT IRON COLUMNS—CONTINUED.

$\frac{L^2}{r^2}$	Ultimate Strength in Lbs. per square inch.			$\frac{L^2}{r^2}$	Ultimate Strength in Lbs. per square inch.		
	Square.	Pin and Square.	Pin.		Square.	Pin and Square.	Pin.
121	26954	23175	20325	205	21978	17937	15151
122	26882	23095	20243	210	21739	17699	14925
123	26810	23015	20161	215	21505	17467	14706
124	26738	22936	20080	220	21277	17241	14493
125	26667	22857	20000	225	21053	17022	14286
126	26596	22779	19920	230	20833	16807	14085
127	26525	22701	19841	235	20619	16598	13889
128	26455	22624	19763	240	20408	16394	13698
129	26385	22548	19685	245	20202	16194	13513
130	26316	22472	19608	250	20000	16000	13333
131	26247	22396	19531	255	19802	15810	13158
132	26178	22321	19455	260	19608	15625	12987
133	26110	22247	19380	265	19417	15444	12821
134	26042	22173	19305	270	19231	15267	12658
135	25974	22099	19231	275	19047	15094	12500
136	25907	22026	19157	280	18868	14925	12346
137	25840	21954	19084	285	18692	14760	12195
138	25773	21882	19011	290	18519	14599	12048
139	25707	21810	18938	295	18349	14440	11905
140	25641	21739	18868	300	18182	14286	11765
141	25575	21668	18797	310	17857	13986	11494
142	25510	21598	18727	320	17544	13699	11236
143	25445	21529	18657	330	17241	13423	10989
144	25381	21459	18587	340	16949	13158	10753
145	25317	21390	18519	350	16667	12903	10526
146	25253	21322	18450	360	16393	12658	10309
147	25189	21254	18382	370	16129	12422	10101
148	25126	21186	18315	380	15873	12195	9901
149	25063	21119	18248	390	15625	11976	9709
150	25000	21053	18182	400	15385	11765	9524
155	24691	20725	17857	410	15151	11561	9346
160	24390	20408	17544	420	14926	11364	9174
165	24096	20101	17241	430	14706	11173	9009
170	23810	19802	16949	440	14493	10989	8850
175	23529	19512	16667	450	14286	10811	8696
180	23256	19231	16394	460	14085	10638	8547
185	22988	18957	16129	470	13889	10471	8403
190	22727	18692	15873	480	13699	10309	8265
195	22472	18433	15625	490	13514	10152	8130
200	22222	18182	15385	500	13333	10000	8000

ULTIMATE STRENGTH OF WROUGHT IRON COLUMNS.

For different proportions of length in feet (=L).
To least radius of gyration in inches (=r).

Square Bearing:

$$\frac{37500}{1 + .004\,\frac{L^2}{r^2}}$$

Pin and Square Bearing:

$$\frac{37500}{1 + .006\,\frac{L^2}{r^2}}$$

Pin Bearing:

$$\frac{37500}{1 + .008\,\frac{L^2}{r^2}}$$

The above formulæ are usually written with length (=l) expressed in inches as follows :

$$\frac{37500}{1 + \frac{l^2}{36000\,r^2}} \qquad \frac{37500}{1 + \frac{l^2}{24000\,r^2}} \qquad \frac{37500}{1 + \frac{l^2}{18000\,r^2}}$$

To obtain Safe Resistance : } For quiescent loads, as in buildings, divide by 4.
For moving loads, as in bridges, divide by 5.

$\frac{L^2}{r^2}$	Ultimate Strength in Lbs. per square inch.			$\frac{L^2}{r^2}$	Ultimate Strength in Lbs. per square inch.		
	Square.	Pin and Square.	Pin.		Square.	Pin and Square.	Pin.
1	37351	37276	37202	21	34594	33304	32106
2	37202	37056	36909	22	34467	33127	31888
3	37055	36837	36621	23	34341	32952	31672
4	36909	36621	36337	24	34216	32780	31460
5	36765	36408	36058	25	34091	32609	31250
6	36621	36197	35783	26	33968	32440	31043
7	36478	35989	35511	27	33845	32272	30839
8	36337	35783	35244	28	33723	32106	30637
9	36197	35579	34981	29	33602	31942	30438
10	36058	35377	34722	30	33482	31780	30242
11	35920	35178	34467	31	33363	31619	30048
12	35782	34981	34215	32	33245	31460	29857
13	35646	34787	33967	33	33127	31302	29668
14	35511	34594	33723	34	33011	31146	29481
15	35377	34404	33482	35	32895	30992	29297
16	35244	34215	33245	36	32780	30839	29115
17	35112	34029	33011	37	32665	30687	28935
18	34981	33845	32780	38	32552	30537	28758
19	34851	33663	32552	39	32440	30389	28582
20	34722	33482	32328	40	32328	30242	28409

WROUGHT IRON COLUMNS—CONTINUED.

$\frac{L^2}{r^2}$	Ultimate Strength in Lbs. per square inch.			$\frac{L^2}{r^2}$	Ultimate Strength in Lbs. per square inch.		
	Square.	Pin and Square.	Pin.		Square.	Pin and Square.	Pin.
41	32216	30096	28238	81	28323	25236	22755
42	32106	29952	28069	82	28238	25134	22645
43	31997	29809	27902	83	28153	25033	22536
44	31888	29668	27737	84	28069	24934	22428
45	31780	29528	27574	85	27985	24834	22321
46	31672	29389	27412	86	27902	24736	22216
47	31566	29251	27253	87	27819	24639	22111
48	31460	29115	27095	88	27737	24542	22007
49	31355	28980	26940	89	27655	24446	21904
50	31250	28846	26786	90	27574	24351	21802
51	31146	28714	26634	91	27493	24256	21701
52	31043	28582	26483	92	27412	24162	21601
53	30941	28452	26334	93	27332	24069	21502
54	30839	28323	26187	94	27253	23977	21404
55	30738	28195	26042	95	27174	23885	21307
56	30637	28069	25898	96	27095	23794	21210
57	30537	27943	25755	97	27017	23704	21115
58	30438	27819	25615	98	26940	23615	21020
59	30340	27696	25476	99	26862	23526	20926
60	30242	27574	25338	100	26786	23438	20833
61	30145	27452	25202	101	26709	23350	20741
62	30048	27332	25067	102	26634	23263	20650
63	29952	27213	24934	103	26558	23177	20559
64	29857	27095	24802	104	26483	23091	20469
65	29762	26978	24671	105	26408	23006	20380
66	29668	26862	24542	106	26334	22922	20292
67	29574	26748	24414	107	26261	22838	20205
68	29481	26634	24288	108	26187	22755	20118
69	29389	26521	24162	109	26114	22672	20032
70	29297	26408	24038	110	26042	22590	19947
71	29206	26297	23916	111	25970	22509	19862
72	29115	26187	23794	112	25898	22428	19778
73	29025	26078	23674	113	25826	22348	19695
74	28935	25970	23555	114	25755	22268	19613
75	28846	25862	23438	115	25685	22189	19531
76	28758	25755	23321	116	25615	22111	19450
77	28670	25650	23205	117	25545	22033	19370
78	28582	25545	23091	118	25476	21956	19290
79	28495	25441	22978	119	25407	21879	19211
80	28409	25338	22866	120	25338	21802	19133

WROUGHT IRON COLUMNS—CONTINUED.

$\frac{L^2}{r^2}$	Ultimate Strength in Lbs. per square inch.			$\frac{L^2}{r^2}$	Ultimate Strength in Lbs. per square inch.		
	Square.	Pin and Square.	Pin.		Square.	Pin and Square.	Pin.
121	25270	21726	19055	205	20604	16816	14205
122	25202	21651	18978	210	20380	16593	13993
123	25134	21576	18901	215	20161	16376	13787
124	25067	21502	18825	220	19947	16164	13587
125	25000	21429	18750	225	19737	15957	13393
126	24933	21355	18675	230	19531	15756	13204
127	24867	21283	18601	235	19330	15560	13021
128	24802	21210	18528	240	19133	15369	12842
129	24736	21138	18455	245	18939	15182	12669
130	24671	21067	18382	250	18750	15000	12500
131	24606	20997	18311	255	18564	14822	12336
132	24542	20926	18239	260	18382	14648	12175
133	24478	20857	18169	265	18204	14479	12019
134	24414	20787	18098	270	18029	14313	11867
135	24351	20718	18029	275	17857	14151	11719
136	24288	20650	17960	280	17689	13992	11574
137	24225	20582	17891	285	17523	13838	11433
138	24162	20514	17823	290	17361	13686	11295
139	24100	20447	17756	295	17202	13538	11161
140	24039	20380	17689	300	17045	13393	11029
141	23977	20314	17622	310	16741	13112	10776
142	23916	20248	17556	320	16447	12842	10534
143	23855	20183	17491	330	16164	12584	10302
144	23794	20118	17426	340	15890	12336	10081
145	23734	20053	17361	350	15625	12097	9868
146	23674	19989	17297	360	15369	11867	9665
147	23615	19926	17233	370	15121	11646	9470
148	23555	19862	17170	380	14881	11433	9282
149	23496	19799	17108	390	14648	11228	9102
150	23437	19737	17045	400	14423	11029	8929
155	23148	19430	16741	410	14205	10838	8762
160	22866	19133	16447	420	13993	10653	8601
165	22590	18844	16164	430	13787	10475	8446
170	22321	18564	15890	440	13587	10302	8296
175	22059	18293	15625	450	13393	10135	8152
180	21802	18029	15369	460	13204	9973	8013
185	21552	17773	15121	470	13021	9817	7878
190	21307	17523	14881	480	12843	9665	7748
195	21067	17281	14648	490	12669	9518	7622
200	20833	17045	14423	500	12500	9375	7500

Safe Strength per square inch of Two Channels Latticed. Flat at both ends. $f = \dfrac{8000}{1+\dfrac{4}{1000}\,\dfrac{L^2}{r^2}}$ Total Strength Interlined.

Length in Feet.	Two 15″ Channels.			Two 12″ Channels.			Two 12″ Channels.			Two 10″ Channels.			Two 10″ Channels.			Two 8″ Channels.		Two 8″ Channels.		Two 7″ Channels.		Two 7″ Channels.		Two 6″ Channels.	Two 5″ Channels.
	Lbs. per foot.			Lbs. per foot.			Lbs. per foot.			Lbs. per foot.			Lbs. per foot.			w	w	w	w	w	w	w	w	w	w
	40.0	50.0	60.0	30.0	40.0	50.0	22.5	26.0	30.0	20.0	28.0	35.0	17.5	24.0	30.0	16.0	28.0	12.5	15.5	14.0	20.0	10.5	13.5	8.5	6.5
	r^2 inches.			r^2 inches.			r^2 inches.			r^2 inches.			r^2 inches.			r^2	r^2	r^2	r^2	r^2	r^2	r^2	r^2	r^2	r^2
	29.9	27.7	26.2	19.6	17.7	16.5	20.8	19.6	18.6	14.9	13.0	12.1	14.4	12.7	11.9	9.4	7.7	9.18	8.42	7.29	6.32	7.13	6.45	5.1	3.59
	189.4	236.6	283.7	141.1	187.7	234.3	106.0	122.3	141.0	93.5	130.4	162.6	81.7	111.7	139.3	73.7	127.8	57.5	71.0	63.7	90.3	47.7	61.0	37.8	28.1
10	7894	7886	7880	7840	7823	7811	7849	7840	7832	7791	7761	7744	7784	7756	7740	7674	7605	7666	7638	7584	7524	7575	7533	7418	7198
	189.0	236.1	282.8	140.5	186.9	233.2	105.5	121.8	140.4	93.0	129.6	161.5	86.3	111.0	138.4	73.0	126.4	57.0	70.4	63.0	89.2	47.2	60.3	37.3	27.5
11	7873	7863	7855	7807	7787	7772	7818	7807	7798	7748	7713	7692	7740	7706	7687	7608	7526	7600	7565	7502	7431	7491	7442	7307	7050
	188.4	235.1	281.8	139.9	186.0	231.9	105.1	121.2	139.7	92.4	128.7	160.4	80.8	110.2	137.3	72.4	125.0	56.5	69.6	62.3	88.0	46.6	59.5	36.7	26.9
12	7849	7838	7828	7772	7748	7730	7784	7772	7760	7702	7661	7636	7693	7653	7631	7538	7443	7528	7488	7414	7332	7402	7344	7189	6894
	187.7	234.3	280.7	139.2	184.9	230.6	104.6	120.6	139.0	91.8	127.8	159.1	80.2	109.4	136.3	71.6	123.5	55.9	68.9	61.5	86.7	46.0	58.6	36.0	26.3
13	7823	7810	7799	7733	7706	7685	7748	7733	7720	7653	7605	7577	7642	7596	7570	7463	7354	7452	7405	7322	7227	7308	7241	7064	6732
	187.1	233.4	279.6	138.5	183.9	229.1	104.1	120.0	138.2	91.2	126.8	157.8	79.7	108.5	135.1	70.9	122.0	55.3	68.1	60.7	85.4	45.4	57.8	35.4	25.6
14	7796	7780	7768	7693	7661	7637	7710	7692	7676	7600	7545	7513	7587	7535	7505	7384	7261	7370	7319	7224	7118	7208	7133	6934	6566
	186.4	232.4	278.4	137.7	182.7	227.6	103.5	119.3	137.3	90.5	125.7	156.4	79.1	107.6	133.9	70.1	120.3	54.6	67.2	59.8	84.0	44.8	56.9	34.7	24.9
15	7766	7748	7734	7649	7614	7586	7668	7649	7630	7544	7482	7446	7530	7470	7438	7302	7163	7286	7228	7121	7003	7104	7020	6800	6396
	185.6	231.4	277.1	136.8	181.5	226.0	102.9	118.6	136.5	89.8	124.6	154.9	78.4	106.6	132.6	69.3	118.6	51.0	66.3	58.9	82.6	44.1	55.9	34.0	24.3
16	7735	7715	7699	7602	7562	7532	7625	7603	7582	7486	7416	7376	7469	7403	7366	7214	7061	7198	7133	7014	6885	6996	6904	6662	6225
	184.8	230.4	275.8	136.0	180.2	224.3	102.3	117.8	135.6	89.1	123.4	153.4	77.8	105.6	131.2	68.4	116.9	53.3	65.4	58.0	81.2	43.4	54.9	33.3	23.6
17	7702	7680	7662	7554	7510	7476	7579	7554	7532	7424	7347	7303	7405	7333	7292	7124	6956	7106	7034	6905	6763	6884	6784	6522	6052
	184.0	229.3	274.4	135.1	178.9	222.5	101.7	117.1	134.6	88.3	122.2	151.7	77.1	104.5	129.9	67.5	115.0	52.6	64.5	57.1	79.7	42.7	54.0	32.5	22.9
18	7668	7643	7623	7504	7454	7418	7531	7504	7479	7360	7275	7226	7340	7260	7215	7031	6848	7010	6933	6792	6638	6770	6662	6379	5878
	183.1	228.2	272.9	134.1	177.5	220.7	101.0	116.2	133.6	87.5	121.0	150.1	76.3	103.4	128.4	66.6	113.2	51.8	63.5	56.1	78.1	41.9	52.9	31.8	22.2
19	7631	7605	7582	7451	7396	7356	7481	7451	7424	7294	7200	7147	7271	7183	7134	6935	6737	6912	6829	6677	6512	6653	6537	6235	5705

20	182.3	226.9	271.4	133.1	176.1	218.8	100.3	115.4	132.6	86.7	119.7	148.4	75.6	102.3	126.9	65.6	111.3	51.1	62.5	55.1	76.6	41.2	51.9	31.1	21.6
	7594	7563	7540	7396	7337	7293	7429	7396	7367	7224	7129	7066	7200	7105	7052	6836	6624	6813	6723	6560	6384	6534	6410	6090	5534
21	181.3	225.6	269.8	132.1	174.6	216.8	99.6	114.5	131.5	85.8	118.3	146.6	74.8	101.1	125.4	64.7	109.3	50.3	61.5	54.1	75.0	40.4	50.9	30.3	20.9
	7554	7521	7495	7340	7275	7228	7375	7340	7307	7153	7044	6982	7127	7024	6967	6737	6509	6711	6614	6442	6254	6414	6282	5944	5364
22	180.3	224.3	268.2	131.1	173.1	214.8	98.8	113.6	130.4	85.0	117.0	144.8	74.0	100.0	123.8	63.7	107.4	49.6	60.5	53.1	73.5	39.6	49.8	29.6	20.2
	7514	7477	7450	7281	7212	7160	7319	7281	7246	7080	6963	6897	7052	6942	6880	6634	6393	6607	6505	6322	6125	6292	6154	5799	5198
23	179.3	223.0	266.5	130.0	171.5	212.7	98.0	112.6	129.3	84.1	115.6	143.0	73.2	98.8	122.2	62.7	105.4	48.8	59.5	52.1	71.9	38.9	48.8	28.8	19.6
	7472	7432	7402	7220	7146	7090	7262	7220	7183	7005	6880	6809	6975	6858	6792	6530	6276	6502	6394	6200	5994	6170	6024	5654	5033
24	178.3	221.6	264.7	128.8	169.9	210.6	97.2	111.7	128.1	83.1	114.2	141.1	72.4	97.5	120.6	61.7	103.4	48.0	58.4	51.1	70.4	38.1	47.7	28.1	19.0
	7428	7385	7353	7158	7078	7020	7202	7160	7118	6929	6796	6721	6897	6772	6702	6426	6157	6395	6282	6079	5863	6047	5894	5510	4873
25	177.2	220.1	262.9	127.7	168.2	208.4	96.4	110.7	126.9	82.2	112.7	139.2	71.6	96.3	119.0	60.7	101.4	47.2	57.4	50.0	68.8	37.3	46.7	27.4	18.4
	7383	7337	7304	7095	7010	6947	7142	7095	7052	6851	6710	6630	6816	6685	6611	6320	6039	6288	6169	5957	5733	5924	5766	5368	4716
26	176.0	218.7	261.0	126.5	166.5	206.2	95.6	109.7	125.7	81.2	111.3	137.3	70.7	95.0	117.3	59.6	99.5	46.3	56.3	49.0	67.2	36.5	45.7	26.7	17.8
	7336	7289	7252	7030	6940	6873	7080	7030	6984	6771	6623	6540	6735	6596	6519	6213	5921	6180	6056	5836	5603	5801	5637	5228	4563
27	175.0	217.1	259.1	125.3	164.8	203.4	94.7	108.6	124.5	80.3	109.8	135.4	69.9	93.7	115.7	58.6	97.5	45.5	55.3	48.0	65.7	35.8	44.6	26.0	17.2
	7290	7238	7199	6964	6869	6799	7016	6964	6916	6691	6534	6446	6653	6506	6426	6106	5803	6072	5942	5715	5474	5678	5510	5090	4414
28	173.8	215.6	257.2	124.1	163.1	01.7	93.8	107.6	123.2	79.3	108.3	133.4	69.0	92.4	114.0	57.6	95.5	44.7	54.2	47.0	64.2	35.0	43.6	25.3	16.7
	7241	7186	7145	6897	6796	6722	6952	6897	6846	6609	6446	6353	6569	6416	6332	6000	5685	5964	5829	5593	5347	5556	5383	4954	4270
29	172.6	214.0	255.2	122.9	161.3	199.4	93.0	106.5	121.9	78.3	106.8	131.5	68.1	91.1	112.3	56.6	93.5	43.9	53.2	46.0	62.7	34.2	42.6	24.6	16.1
	7191	7134	7090	6828	6723	6645	6886	6828	6775	6526	6355	6260	6485	6325	6237	5892	5568	5855	5717	5474	5221	5436	5258	4821	4130
30	171.4	212.4	253.2	121.6	159.5	197.0	92.1	105.4	120.6	77.3	105.3	129.5	67.2	89.8	110.5	55.5	91.3	43.1	52.1	45.0	61.2	33.5	41.6	23.9	15.6
	7140	7080	7034	6759	6648	6567	6820	6758	6703	6443	6265	6166	6400	6233	6142	5785	5452	5746	5604	5356	5097	5316	5134	4690	3995
32	168.9	209.1	249.0	119.1	155.9	192.3	90.2	103.2	118.0	75.3	102.2	125.5	65.4	87.1	107.1	53.5	87.7	41.5	50.1	43.0	58.2	32.0	39.6	22.6	14.6
	7036	6969	6918	6617	6497	6409	6684	6617	6556	6275	6084	5977	6228	6050	5951	5572	5222	5535	5382	5123	4854	5081	4893	4437	3737
34	166.3	205.7	244.8	116.5	152.2	187.5	88.4	101.0	115.3	73.3	99.1	121.5	63.6	84.5	103.7	51.5	84.0	39.9	48.0	41.1	55.4	30.6	37.7	21.4	13.6
	6928	6856	6800	6473	6343	6249	6545	6473	6407	6106	5901	5788	6056	5865	5762	5362	4998	5320	5164	4895	4620	4853	4659	4196	3497
36	163.6	202.2	240.4	113.9	148.5	182.6	86.4	98.7	112.6	71.2	96.1	117.6	61.8	81.8	100.3	49.5	80.3	38.3	46.1	39.3	52.7	29.2	35.9	20.2	12.8
	6818	6739	6679	6327	6188	6087	6404	6327	6256	5935	5719	5600	5882	5681	5573	5157	4781	5113	4952	4675	4395	4632	4435	3967	3273
38	160.9	198.6	236.0	111.2	144.8	177.8	84.5	96.4	109.9	69.2	93.1	113.7	60.0	79.2	96.9	47.6	76.8	36.8	44.1	37.5	50.2	27.8	34.2	19.1	12.0
	6705	6620	6555	6179	6032	5925	6262	6179	6105	5765	5539	5415	5710	5499	5386	4955	4571	4910	4746	4464	4180	4419	4221	3752	3066
40	158.2	194.9	231.4	108.5	141.0	172.9	82.6	94.1	107.1	67.2	90.0	109.9	58.1	76.6	93.6	45.7	73.4	35.4	42.3	35.8	47.7	26.6	32.5	18.1	11.2
	6590	6498	6429	6031	5875	5764	6118	6031	5952	5596	5360	5232	5538	5319	5202	4760	4369	4714	4545	4260	3975	4216	4015	3548	2875

Safe Strength per square inch of Two Channels Latticed. Pin and Square. $f=\dfrac{8000}{1+\dfrac{6}{1000}\dfrac{L^2}{r^2}}$ Total Strength Interlined.

Length in Feet.	Two 15″ Channels.			Two 12″ Channels.			Two 12″ Channels.			Two 10″ Channels.			Two 10″ Channels.			Two 8″ Channels.		Two 8″ Channels.		Two 7″ Channels.		Two 7″ Channels.		Two 6″ Channels.	Two 5″ Channels.
	Lbs. per foot.			Lbs. per foot.			Lbs. per foot.			Lbs. per foot.			Lbs. per foot.			w	w	w	w	w	w	w	w	w	w
	40.0	50.0	60.0	30.0	40.0	50.0	22.5	26.0	30.0	20.0	28.0	35.0	17.5	24.0	30.0	16.0	28.0	12.5	15.5	14.0	20.0	10.5	13.5	8.5	6.5
	r² inches.			r² inches.			r² inches.			r² inches.			r² inches.			r²	r²	r²	r²	r²	r²	r²	r²	r²	r²
	29.9	27.7	26.2	19.6	17.7	16.5	20.8	19.6	18.6	14.9	13.0	12.1	14.4	12.7	11.9	9.4	7.7	9.18	8.42	7.29	6.32	7.13	6.45	5.1	3.59
	188.2	234.9	281.5	139.7	185.7	231.6	105.0	121.1	139.5	92.3	128.5	160.1	80.6	110.0	137.1	72.2	124.7	56.3	69.5	62.1	87.7	46.5	59.3	36.5	26.7
10	7842	7830	7821	7762	7738	7719	7776	7762	7750	7690	7647	7622	7680	7639	7616	7525	7422	7509	7468	7392	7306	7379	7319	7158	6855
	187.4	233.9	280.2	138.8	184.4	229.9	104.4	120.3	138.6	91.5	127.3	158.5	80.0	109.0	135.7	71.3	122.8	55.6	68.5	61.1	86.1	45.7	58.2	35.7	26.0
11	7810	7796	7783	7714	7685	7663	7730	7714	7699	7628	7577	7547	7616	7567	7540	7432	7311	7414	7365	7275	7176	7261	7190	7003	6654
	186.6	232.7	278.8	137.9	183.1	228.0	103.7	119.5	137.6	90.7	126.0	156.8	79.2	107.9	134.3	70.4	120.8	54.8	67.5	60.1	84.5	45.0	57.1	34.9	25.1
12	7775	7758	7744	7662	7628	7602	7681	7662	7645	7562	7501	7467	7547	7490	7459	7333	7193	7312	7256	7152	7038	7135	7055	6841	6448
	185.7	231.5	277.3	136.9	181.6	226.1	103.0	118.7	136.5	89.9	124.7	155.0	78.5	106.7	132.7	69.4	118.8	54.0	66.4	59.0	82.7	44.1	56.0	34.0	24.3
13	7738	7718	7702	7607	7567	7537	7628	7607	7586	7490	7421	7382	7474	7408	7372	7229	7069	7204	7140	7023	6894	7004	6913	6673	6238
	184.7	230.2	275.6	135.8	180.0	224.0	102.2	117.7	135.4	89.0	123.2	153.1	77.7	105.4	131.0	68.3	116.6	53.2	65.3	57.9	80.9	43.3	51.8	33.2	23.5
14	7697	7674	7656	7547	7502	7468	7572	7547	7524	7415	7336	7291	7396	7322	7281	7119	6940	7092	7020	6889	6745	6868	6766	6501	6026
	183.7	228.8	273.9	134.7	178.4	221.8	101.4	116.8	134.3	88.0	121.7	151.1	76.8	104.1	129.3	67.2	114.4	52.3	64.1	56.7	79.1	42.4	53.6	32.3	22.7
15	7655	7628	7608	7484	7435	7395	7512	7484	7459	7335	7247	7197	7314	7231	7185	7005	6807	6974	6895	6750	6592	6727	6615	6326	5814
	182.6	227.4	272.0	133.5	176.7	219.6	100.6	115.7	133.0	87.0	120.2	149.1	75.9	102.8	127.5	66.1	112.0	51.4	62.9	55.5	77.2	41.5	52.3	31.4	21.7
16	7609	7579	7557	7419	7361	7319	7450	7419	7390	7252	7154	7099	7229	7137	7085	6886	6669	6853	6766	6608	6436	6582	6462	6148	5603
	181.5	225.9	270.1	132.3	174.9	217.2	99.7	114.7	131.7	86.0	118.6	146.9	75.0	101.4	125.7	64.9	109.7	50.5	61.7	54.3	75.4	40.5	51.1	30.4	21.0
17	7561	7529	7503	7350	7286	7239	7384	7350	7318	7166	7058	6997	7140	7039	6983	6765	6530	6729	6634	6463	6278	6435	6305	5970	5394
	180.3	224.3	268.1	131.0	173.0	214.7	98.8	113.5	130.4	84.9	116.9	144.7	74.0	99.9	123.8	63.8	107.3	49.5	60.5	53.1	73.4	39.6	49.8	29.5	20.2
18	7512	7475	7447	7278	7209	7157	7316	7278	7243	7077	6960	6893	7048	6938	6877	6641	6388	6602	6500	6316	6118	6286	6147	5792	5190
	179.0	222.6	266.0	129.7	171.1	212.1	97.8	112.4	129.0	83.8	115.2	142.5	73.0	98.4	121.8	62.5	104.9	48.5	59.2	51.8	71.5	38.7	48.5	28.6	19.5
19	7460	7420	7389	7204	7127	7071	7246	7204	7166	6984	6858	6785	6954	6835	6768	6515	6244	6473	6363	6168	5958	6136	5989	5615	4989

	177.7	220.8	263.8	128.3	169.1	209.5	96.8	111.2	127.5	82.7	113.4	140.2	72.0	96.9	119.8	61.3	102.5	47.6	57.9	50.6	69.6	37.7	47.2	27.7	18.7
20	7405	7362	7329	7128	7045	6984	7172	7128	7086	6890	6753	6676	6858	6729	6657	6387	6099	6342	6226	6019	5798	5985	5830	5440	4794
	176.4	219.1	261.6	126.9	167.0	206.8	95.8	109.9	126.1	81.5	111.7	137.8	71.0	95.3	117.8	60.1	100.0	46.6	56.6	49.3	67.7	36.8	46.0	26.9	18.0
21	7349	7303	7266	7048	6960	6894	7097	7048	7004	6793	6647	6564	6758	6621	6545	6257	5954	6210	6087	5870	5639	5835	5673	5267	4605
	175.0	217.2	259.3	125.4	164.9	204.1	94.8	108.7	124.5	80.3	109.9	135.5	69.9	93.8	115.8	58.8	97.6	45.6	55.3	48.1	65.8	35.8	44.7	26.0	17.2
22	7292	7241	7202	6969	6872	6803	7020	6968	6920	6695	6539	6452	6658	6511	6431	6127	5809	6078	5948	5721	5482	5685	5516	5097	4423
	173.6	215.3	256.9	123.9	162.8	201.3	93.7	107.4	123.0	79.1	108.0	133.1	68.8	92.2	113.7	57.6	95.2	44.6	54.0	46.8	63.9	34.9	43.4	25.1	16.6
23	7233	7177	7136	6885	6784	6709	6941	6885	6834	6595	6430	6338	6555	6401	6316	5997	5665	5945	5809	5573	5326	5536	5362	4931	4246
	172.1	213.4	254.4	122.4	160.6	198.4	92.6	106.1	121.4	77.9	106.2	130.7	67.7	90.6	111.6	56.3	92.7	43.6	52.7	45.6	62.1	33.9	42.2	24.3	15.9
24	7171	7112	7068	6801	6693	6615	6860	6801	6747	6494	6320	6223	6452	6289	6200	5866	5521	5812	5672	5427	5172	5388	5209	4768	4076
	170.6	211.4	252.0	120.9	158.4	195.5	91.5	104.8	119.8	76.7	104.3	128.2	66.6	88.9	109.5	55.1	90.4	42.6	51.5	44.4	60.3	33.0	41.0	23.5	15.3
25	7109	7046	6999	6715	6601	6518	6778	6715	6658	6391	6209	6107	6347	6177	6083	5736	5380	5680	5535	5283	5021	5243	5059	4610	3913
	169.1	209.3	249.4	119.3	156.2	192.7	90.4	103.4	118.2	75.5	102.4	125.8	65.5	87.3	107.4	53.8	88.0	41.6	50.2	43.2	58.5	32.1	39.8	22.7	14.6
26	7045	6978	6928	6629	6509	6422	6695	6629	6568	6288	6098	5992	6242	6064	5966	5607	5240	5549	5399	5140	4873	5099	4911	4456	3756
	167.5	207.3	246.8	117.7	154.0	189.7	89.2	102.0	116.6	74.2	100.6	123.4	64.4	85.7	105.3	52.6	85.7	40.6	49.0	42.0	56.7	31.2	38.6	22.0	14.1
27	6979	6909	6856	6541	6415	6324	6610	6541	6477	6185	5986	5876	6136	5951	5850	5478	5102	5418	5265	5000	4728	4958	4767	4306	3606
	165.9	205.2	244.1	116.1	151.7	186.7	88.1	100.7	114.9	73.0	98.7	121.0	63.3	84.1	103.2	51.4	83.4	39.7	47.7	40.8	55.0	30.4	37.5	21.2	13.5
28	6913	6839	6782	6452	6320	6225	6524	6452	6385	6080	5874	5760	6030	5838	5734	5350	4966	5290	5133	4862	4586	4820	4626	4161	3463
	164.3	203.0	241.5	114.5	149.4	183.8	86.9	99.2	113.3	71.7	96.8	118.6	62.2	82.4	101.1	50.2	81.2	38.7	46.5	39.7	53.4	29.5	36.4	20.5	13.0
29	6845	6767	6708	6362	6225	6127	6438	6362	6293	5976	5763	5646	5924	5725	5618	5225	4833	5162	5002	4727	4448	4685	4488	4021	3326
	162.6	200.8	238.8	112.9	147.1	180.8	85.7	97.8	111.6	70.5	95.0	116.1	61.1	80.8	99.1	49.0	79.0	37.8	45.3	38.6	51.8	28.7	35.3	19.8	12.5
30	6776	6695	6633	6272	6130	6027	6351	6272	6200	5872	5652	5531	5818	5613	5503	5101	4702	5037	4874	4596	4314	4552	4354	3886	3195
	159.3	196.4	233.3	109.6	142.5	174.9	83.4	95.0	108.2	68.0	91.3	111.4	58.9	77.6	95.0	46.6	74.7	35.9	43.0	36.5	48.7	27.1	33.2	18.5	11.5
32	6636	6548	6480	6091	5938	5829	6176	6091	6014	5664	5433	5306	5607	5392	5276	4858	4449	4792	4625	4341	4056	4297	4097	3628	2950
	155.8	191.9	227.7	106.4	137.9	169.0	81.0	92.2	101.9	65.5	87.7	106.8	56.7	74.5	91.0	44.4	70.7	34.2	40.8	31.4	45.8	25.5	31.2	17.3	10.6
34	6494	6398	6326	5909	5748	5632	6000	5909	5827	5459	5218	5085	5399	5174	5054	4624	4208	4557	4386	4100	3814	4055	3855	3390	2729
	152.4	187.4	222.1	103.1	133.4	163.1	78.6	89.4	101.6	63.1	84.1	102.3	54.6	71.5	87.1	42.2	66.9	32.5	38.7	32.5	43.0	24.1	29.4	16.2	9.9
36	6349	6247	6169	5728	5558	5438	5823	5728	5642	5257	5006	4870	5195	4962	4838	4399	3980	4331	4159	3871	3587	3827	3627	3168	2527
	148.9	182.8	216.4	99.9	128.9	157.4	76.3	86.6	98.2	60.7	80.6	97.9	52.4	68.5	83.3	40.2	63.2	30.9	36.7	30.7	40.5	22.7	27.7	15.1	9.1
38	6203	6094	6011	5548	5371	5246	5648	5548	5458	5058	4800	4662	4995	4755	4629	4184	3764	4116	3943	3656	3374	3611	3414	2964	2344
	145.3	178.2	210.8	96.7	124.5	151.7	73.9	83.8	95.0	58.4	77.3	93.7	50.4	65.6	79.7	38.2	59.8	29.3	34.8	29.0	38.1	21.5	26.0	14.2	8.5
40	6056	5941	5855	5370	5187	5058	5474	5370	5277	4865	4601	4461	4800	4556	4428	3978	3560	3910	3738	3453	3176	3409	3215	2775	2177

Safe Strength per square inch of Two Channels Latticed. Pin at both ends. $f = \frac{8000}{1+\frac{8}{1000}\frac{L^2}{r^2}}$ Total Strength Interlined.

Length in Feet	Two 15″ Channels.			Two 12″ Channels.			Two 12″ Channels.			Two 10″ Channels.			Two 10″ Channels.			Two 8″ Channels.		Two 8″ Channels.		Two 7″ Channels.		Two 7″ Channels.		Two 6″ Chan-nels.	Two 5″ Chan-nels.
	Lbs. per foot.			Lbs. per foot.			Lbs. per foot.			Lbs. per foot.			Lbs. per foot.			w	w	w	w	w	w	w	w	w	w
	40.0	50 0	60.0	30.0	40.0	50.0	22.5	26.0	30.0	20.0	28.0	35.0	17.5	24.0	30.0	16.0	28.0	12.5	15.5	14.0	20.0	10.5	13.5	8.5	6.5
	r^2 inches.			r^2 inches.			r^2 inches.			r^2 inches.			r^2 inches.			r^2	r^2	r^2	r^2	r^2	r^2	r^2	r^2	r^2	r^2
—	29.9	27.7	26.2	19.6	17.7	16.5	20.8	19.6	18.6	14.9	13.0	12.1	14.4	12.7	11.9	9.4	7.7	9.18	8.42	7.29	6.32	7.13	6.45	5.1	3.59
	187.0	233.2	279.5	138.4	183.7	228.9	104.0	119.9	138.0	91.1	126.6	157.5	79.6	108.4	134.9	70.8	121.7	55.2	67.9	60.6	85.2	45.3	57.7	35.3	25.5
10	7792	7775	7763	7687	7654	7631	7704	7687	7670	7593	7536	7503	7579	7526	7496	7373	7246	7358	7306	7209	7101	7193	7118	6916	6542
	186.0	231.9	277.8	137.2	182.0	226.7	103.2	118.9	136 9	90.1	125.1	155.5	78.7	107.0	133.2	69.6	119.4	54.3	66.7	59.3	83.2	44.4	56.3	34.3	24.6
11	7749	7730	7716	7624	7586	7557	7644	7624	7605	7512	7446	7407	7496	7434	7398	7253	7106	7238	7175	7062	6937	7044	6956	6724	6301
	184.9	230.4	275.9	136.0	180.3	224.3	102.3	117.9	135.6	89.1	123.5	153.4	77.8	105.6	131.3	68.4	116.9	53.3	65.4	58 0	81.2	43 4	55 0	33.3	23.6
12	7704	7681	7663	7556	7512	7478	7580	7556	7533	7425	7349	7304	7407	7334	7294	7126	6959	7108	7037	6908	6766	6887	6788	6527	6057
	183.7	228.8	273.9	134.7	178.4	221.8	101.4	116.7	134.2	88.0	121.7	151.1	76.8	104.1	129.3	67.1	114.3	52.3	64.1	56.7	79.1	42.4	53.6	32 3	22.7
13	7654	7628	7608	7484	7432	7394	7512	7484	7458	7334	7247	7196	7314	7231	7184	6994	6805	6973	6893	6749	6590	6725	6614	6324	5812
	182.4	227.1	271.8	133.3	176.4	219.2	100.4	115.6	132.8	86.9	119.9	148.7	75.8	102.5	127.2	65.8	111.7	51.2	62.7	55.3	76.9	41.3	52.1	31.2	21.7
14	7602	7572	7549	7408	7349	7306	7439	7408	7377	7238	7139	7082	7215	7121	7068	6856	6647	6833	6744	6585	6410	6559	6436	6119	5568
	181.1	225.3	269.5	131.9	174.3	216.4	99.4	114.3	131.3	85.7	118.1	146.2	74.7	100.9	125.1	64.5	108.9	50 2	61.3	53.9	74.7	40.2	50.7	30.2	20.8
15	7546	7512	7486	7328	7263	7214	7363	7328	7294	7138	7027	6964	7111	7006	6949	6715	6484	6689	6591	6416	6227	6388	6255	5913	5328
	179.7	223.5	267.1	130.4	172.1	213.5	98.3	113.0	129.7	84.4	116.1	143.7	73.5	99.2	122.9	63.1	106.2	49.1	59 8	52.5	72.5	39.2	49.2	29.1	19.9
16	7487	7450	7420	7243	7170	7116	7284	7244	7206	7034	6911	6842	7004	6889	6826	6569	6319	6541	6435	6245	6042	6215	6072	5708	5094
	178.2	221.5	264.7	128.8	169.8	210.5	97.2	111.6	128.1	83.1	114.1	141.1	72.4	97.5	120.6	61.6	103.4	47.9	58.4	51.0	70.3	38.1	47.7	28.1	19.0
17	7426	7384	7352	7156	7076	7016	7200	7156	7116	6925	6792	6717	6893	6768	6699	6421	6153	6391	6276	6073	5858	6041	5889	5504	4866
	176.7	219.5	262.1	127.2	167.5	207.5	96.0	110.2	126.4	81.8	112.0	138.4	71.2	95.7	118.2	60.2	100.6	46.8	56.9	49.6	68.1	37.0	46.2	27.1	18.1
18	7362	7316	7280	7066	6978	6915	7114	7066	7021	6814	6670	6589	6780	6645	6569	6272	5986	6238	6117	5902	5674	5868	5707	5304	4646
	175.1	217.3	259.4	125.5	165.1	204.3	94.8	108.8	124.6	80.4	110.0	135.7	70.0	93.9	115.9	58.7	97.7	45.6	55.4	48.1	65.9	35.9	44.8	26.1	17.3
19	7296	7245	7206	6973	6878	6809	7025	6972	6925	6702	6546	6460	6663	6518	6438	6120	5818	6086	5957	5730	5491	5694	5526	5108	4434

	173.4	215.1	256.6	123.8	162.6	201.0	93.6	107.3	122.9	79.0	107.8	132.9	68.7	92.0	113.5	57.3	94.9	44.5	53.9	46.7	63.7	34.8	43.3	25.1	16.5
20	7227	7172	7129	6877	6775	6700	6934	6878	6826	6586	6420	6327	6546	6390	6305	5968	5651	5932	5797	5560	5311	5522	5347	4916	4230
	171.7	212.9	253.8	122.0	160.1	197.7	92.3	105.8	121.0	77.6	105.7	130.1	67.5	90.2	111.1	55.8	92.2	43.3	52.4	45.3	61.6	33.7	41.9	24 1	15.7
21	7156	7096	7051	6780	6670	6591	6840	6780	6725	6469	6292	6194	6426	6261	6171	5817	5486	5780	5638	5391	5134	5352	5172	4729	4035
	170.0	210.6	250.9	120.2	157.5	194.4	91.0	104.2	119.2	76.2	103.6	127.3	66.2	88.3	108.6	51.4	89.4	42.2	51.0	43.9	59.5	32.7	40.5	23.2	15.0
22	7083	7019	6970	6680	6564	6480	6744	6681	6621	6350	6164	6061	6305	6132	6036	5667	5324	5627	5480	5226	4961	5185	4999	4548	3849
	168.2	208.2	248.0	118.4	155.0	191.0	89.7	102.6	117.3	74.8	101.4	124.5	64.9	86.4	106.2	53.0	86.7	41.1	49.5	42.5	57.5	31.6	39.1	22.3	14.3
23	7008	6940	6888	6580	6457	6368	6648	6580	6517	6230	6035	5927	6184	6001	5902	5516	5163	5476	5324	5061	4792	5020	4830	4372	3672
	166.4	205.7	244.9	116.6	152.3	187.6	88.4	101.0	115.4	73.3	99.2	121.7	63.6	84.5	103 8	51.5	84.1	39.9	48.1	41.2	55.5	30.6	37.8	21.4	13.7
24	6932	6858	6804	6477	6347	6254	6549	6477	6412	6111	5907	5794	6061	5870	5767	5368	5005	5326	5171	4902	4627	4860	4666	4203	3503
	164.5	203.3	241.8	114.7	149.7	184.2	87.1	99.4	113.5	71.9	97.1	118.9	62.3	82.7	101.4	50.1	81.5	38.8	46.7	39.9	53.6	29.6	36.5	20.6	13.0
25	6854	6777	6718	6374	6238	6140	6450	6374	6305	5990	5778	5661	5938	5741	5633	5223	4850	5180	5020	4745	4466	4703	4507	4040	3344
	162.6	201.8	238.7	112.9	147.1	180.8	85.7	97.8	111.6	70.4	94.9	116.1	61.1	80.8	99.0	48.8	79.0	37.8	45.3	38.6	51.7	28.7	35.2	19.8	12.4
26	6775	6694	6631	6270	6128	6025	6350	6270	6198	5870	5650	5531	5816	5611	5500	5079	4700	5035	4871	4593	4311	4550	4351	3883	3192
	160.7	198.3	235.6	111.0	144.5	177.3	84.3	96.2	109.6	69.0	92.8	113.4	59.8	78.9	96.6	47.4	76.5	36.7	44.0	37.3	49.9	27.7	34.0	19.0	11.9
27	6695	6609	6544	6166	6022	5911	6248	6166	6090	5750	5523	5398	5694	5482	5369	4937	4552	4892	4727	4444	4161	4400	4201	3732	3048
	158.7	195.7	232.4	109.1	141.8	173.9	83.0	94.6	107.7	67.6	90.7	110.6	58.5	77.1	94.3	46.1	74.1	35.6	42.6	36.1	48 2	26.8	32.9	18.3	11 4
28	6613	6523	6455	6061	5907	5796	6147	6061	5983	5630	5397	5269	5573	5356	5239	4799	4409	4753	4585	4300	4015	4256	4056	3588	2912
	156.7	193.1	229.2	107.2	139.1	170.5	81.6	92.9	105.7	66.1	88.6	108.0	57.3	75.3	92.0	44.8	71.7	34.6	41.4	34.9	46.5	25.9	31.7	17.6	10.9
29	6531	6437	6366	5956	5796	5683	6045	5956	5875	5512	5272	5142	5453	5230	5110	4663	4270	4616	4447	4160	3875	4116	3916	3449	2784
	154.7	190 5	225.9	105.3	136.5	167.1	80.2	91.3	103.8	64.7	86.5	105.3	56.0	73.5	89.7	43.5	69.5	33.6	40.1	33.8	44.9	25.1	30.6	16.9	10.4
30	6448	6350	6276	5851	5687	5569	5943	5851	5768	5394	5149	5016	5333	5106	4984	4530	4134	4483	4312	4025	3740	3980	3780	3317	2662
	150.7	185.2	219.4	101.6	131.2	160.4	77.5	88.0	100.0	61.9	82.4	100.2	53.5	70.0	85.3	41.0	65.1	31.7	37.7	31.6	41 8	23.5	28.5	15.7	9.51
32	6280	6174	6095	5642	5469	5346	5740	5642	5554	5162	4907	4771	5100	4863	4738	4275	3876	4227	4055	3767	3484	3723	3524	3070	2438
	146.6	179.9	212.9	97.8	126.3	153.8	74.8	84.8	96.2	59.2	78.5	95.2	51.2	66.7	81.0	38.7	61.1	29.9	35 5	29.6	39.0	21.9	26.6	14.5	8.72
34	6110	5998	5913	5436	5254	5127	5538	5436	5343	4936	4675	4534	4872	4629	4501	4033	3635	3985	3813	3526	3247	3482	3287	2844	2237
	142.6	174.7	206.3	94.2	121.1	147.4	72.1	81.6	92.5	56.6	74.8	90.5	48.8	63.4	76.9	36.5	57.3	28.2	33.3	27.7	36.4	20.5	24.9	13.5	8.03
36	5940	5822	5732	5233	5046	4913	5339	5232	5137	4718	4450	4308	4651	4404	4275	3805	3409	3757	3586	3303	3030	3260	3068	2638	2058
	138.5	169.4	199.9	90.6	116.2	141.2	69.4	78.5	88.8	54.1	71.2	86.0	46.6	60.3	73.1	34.5	53.7	26.6	31.4	26.0	33.9	19.2	23.2	12.5	7 40
38	5771	5646	5552	5033	4841	4705	5144	5033	4935	4507	4236	4093	4439	4189	4060	3590	3199	3542	3373	3095	2829	3053	2867	2450	1897
	134.4	164.1	193.4	87.1	111.4	135.2	66.9	75.5	85.3	51.6	67.7	81.6	44.5	57.4	69.4	32.5	50.5	25.1	29 5	24.4	31.7	18.0	21.7	11.6	6.83
40	5602	5471	5374	4840	4643	4505	4953	4840	4739	4303	4031	3887	4235	3984	3854	3388	3005	3342	3174	2903	2644	2862	2680	2279	1752

TABLE OF SQUARE ROOTS.

Nos.	Roots.	Nos.	Roots.	Nos.	Roots.	Nos.	Roots.	Nos.	Roots.
1	1.00	51	7.14	101	10.05	151	12.29	201	14.18
2	1.41	52	7.21	102	10.10	152	12.33	202	14.21
3	1.73	53	7.28	103	10.15	153	12.37	203	14.25
4	2.00	54	7.35	104	10.20	154	12.41	204	14.28
5	2.24	55	7.42	105	10.25	155	12.45	205	14.32
6	2.45	56	7.48	106	10.30	156	12.49	206	14.35
7	2.65	57	7.55	107	10.34	157	12.53	207	14.39
8	2.83	58	7.62	108	10.39	158	12.57	208	14.42
9	3.00	59	7.68	109	10.44	159	12.61	209	14.46
10	3.16	60	7.75	110	10.49	160	12.65	210	14.49
11	3.32	61	7.81	111	10.54	161	12.69	211	14.53
12	3.46	62	7.87	112	10.58	162	12.73	212	14.56
13	3.61	63	7.94	113	10.63	163	12.77	213	14.59
14	3.74	64	8.00	114	10.68	164	12.81	214	14.63
15	3.87	65	8.06	115	10.72	165	12.85	215	14.66
16	4.00	66	8.12	116	10.77	166	12.88	216	14.70
17	4.12	67	8.19	117	10.82	167	12.92	217	14.73
18	4.24	68	8.25	118	10.86	168	12.96	218	14.76
19	4.36	69	8.31	119	10.91	169	13.00	219	14.80
20	4.47	70	8.37	120	10.95	170	13.04	220	14.83
21	4.58	71	8.43	121	11.00	171	13.08	221	14.87
22	4.69	72	8.49	122	11.05	172	13.11	222	14.90
23	4.80	73	8.54	123	11.09	173	13.15	223	14.93
24	4.90	74	8.60	124	11.14	174	13.19	224	14.97
25	5.00	75	8.66	125	11.18	175	13.23	225	15.00
26	5.10	76	8.72	126	11.22	176	13.27	226	15.03
27	5.20	77	8.77	127	11.27	177	13.30	227	15.07
28	5.29	78	8.83	128	11.31	178	13.34	228	15.10
29	5.39	79	8.89	129	11.36	179	13.38	229	15.13
30	5.48	80	8.94	130	11.40	180	13.42	230	15.17
31	5.57	81	9.00	131	11.45	181	13.45	231	15.20
32	5.66	82	9.06	132	11.49	182	13.49	232	15.23
33	5.74	83	9.11	133	11.53	183	13.53	233	15.26
34	5.83	84	9.17	134	11.58	184	13.56	234	15.30
35	5.92	85	9.22	135	11.62	185	13.60	235	15.33
36	6.00	86	9.27	136	11.66	186	13.64	236	15.36
37	6.08	87	9.33	137	11.70	187	13.67	237	15.39
38	6.16	88	9.38	138	11.75	188	13.71	238	15.43
39	6.24	89	9.43	139	11.79	189	13.75	239	15.46
40	6.32	90	9.49	140	11.83	190	13.78	240	15.49
41	6.40	91	9.54	141	11.87	191	13.82	241	15.52
42	6.48	92	9.59	142	11.92	192	13.86	242	15.56
43	6.56	93	9.64	143	11.96	193	13.89	243	15.59
44	6.63	94	9.70	144	12.00	194	13.93	244	15.62
45	6.71	95	9.75	145	12.04	195	13.96	245	15.65
46	6.78	96	9.80	146	12.08	196	14.00	246	15.68
47	6.86	97	9.85	147	12.12	197	14.04	247	15.72
48	6.93	98	9.90	148	12.17	198	14.07	248	15.75
49	7.00	99	9.95	149	12.21	199	14.11	249	15.78
50	7.07	100	10.00	150	12.25	200	14.14	250	15.81

TABLE OF SQUARE ROOTS.

Nos.	Roots.	Nos.	Roots.	Nos.	Roots.	Nos.	Roots.	Nos.	Roots.
251	15.84	301	17.35	351	18.73	401	20.02	451	21.24
252	15.87	302	17.38	352	18.76	402	20.05	452	21.26
253	15.91	303	17.41	353	18.79	403	30.07	453	21.28
254	15.94	304	17.44	354	18.81	404	20.10	454	21.31
255	15.97	305	17.46	355	18.84	405	20.12	455	21.33
256	16.00	306	17.49	356	18.87	406	20.15	456	21.35
257	16.03	307	17.52	357	18.89	407	20.17	457	21.38
258	16.06	308	17.55	358	18.92	408	20.20	458	21.40
259	16.09	309	17.58	359	18.95	409	20.22	459	21.42
260	16.12	310	17.61	360	18.97	410	20.25	460	21.45
261	16.16	311	17.64	361	19.00	411	20.27	461	21.47
262	16.19	312	17.66	362	19.03	412	20.30	462	21.49
263	16.22	313	17.69	363	19 05	413	20.32	463	21.52
264	16.25	314	17.72	364	19.08	414	20.35	464	21.54
265	16.28	315	17.75	365	19.10	415	20.37	465	21.56
266	16.31	316	17.78	366	19.13	416	20.40	466	21.59
267	16.34	317	17.80	367	19.16	417	20.42	467	21.61
268	16.37	318	17.83	368	19.18	418	20.45	468	21.63
269	16.40	319	17.86	369	19.21	419	20.47	469	21.66
270	16.43	320	17.89	370	19.24	420	20.49	470	21.68
271	16.46	321	17.92	371	19.26	421	20.52	471	21.70
272	16.49	322	17.94	372	19.29	422	20.54	472	21.73
273	16.52	323	17.97	373	19.31	423	20.57	473	21.75
274	16.55	324	18.00	374	19.34	424	20.59	474	21.77
275	16.58	325	18.03	375	19.36	425	20.62	475	21.79
276	16.61	326	18.06	376	19.39	426	20.64	476	21.82
277	16.64	327	18.08	377	19.42	427	20.66	477	21.84
278	16.67	328	18.11	378	19.44	428	20.69	478	21.86
279	16.70	329	18.14	379	19.47	429	20.71	479	21.89
280	16.73	330	18.17	380	19.49	430	20.74	480	21.91
281	16.76	331	18.19	381	19.52	431	20.76	481	21.93
282	16.79	332	18.22	382	19.54	432	20.78	482	21.95
283	16.82	333	18.25	383	19.57	433	20.81	483	21.98
284	16.85	334	18.28	384	19.60	434	20.83	484	22.00
285	16.88	335	18.30	385	19.62	435	20.86	485	22.02
286	16.91	336	18.33	386	19.65	436	20.88	486	22.05
287	16.94	337	18.36	387	19.67	437	20.90	487	22.07
288	16.97	338	18.38	388	19.70	438	20.93	488	22.09
289	17.00	339	18.41	389	16.72	439	20.95	489	22.11
290	17.03	340	18.44	390	19.75	440	20.98	490	22.14
291	17.06	341	18.47	391	19.77	441	21.00	491	22.16
292	17.09	342	18.49	392	19.80	442	21.02	492	22.18
293	17.12	343	18.52	393	19.82	443	21.05	493	22.20
294	17.15	344	18.55	394	19.85	444	21.07	494	22.23
295	17.18	345	18.57	395	19.87	445	21.10	495	22.25
296	17.20	346	18.60	396	19.90	446	21.12	496	22.27
297	17.23	347	18.63	397	19.92	447	21.14	497	22.29
298	17.26	348	18.65	398	19.95	448	21.17	498	22.32
299	17.29	349	18.68	399	19.97	449	21.19	499	22.34
300	17.32	350	18.71	400	20.00	450	21.21	500	22.36

TABLE OF SQUARE ROOTS.

Nos.	Roots.	Nos.	Roots.	Nos.	Roots.	Nos.	Roots.	Nos.	Roots.
501	22.38	551	23.47	601	24.52	651	25.51	701	26.48
502	22.41	552	23.49	602	24.54	652	25.53	702	26.50
503	22.43	553	23.52	603	24.56	653	25.55	703	26.51
504	22.45	554	23.54	604	24.58	654	25.57	704	26.53
505	22.47	555	23.56	605	24.60	655	25.59	705	26.55
506	22.49	556	23.58	606	24.62	656	25.61	706	26.57
507	22.52	557	23.60	607	24.64	657	25.63	707	26.59
508	22.54	558	23.62	608	24.66	658	25.65	708	26.61
509	22.56	559	23.64	609	24.68	659	25.67	709	26.63
510	22.58	560	23.66	610	24.70	660	25.69	710	26.65
511	22.61	561	23.69	611	24.72	661	25.71	711	26.66
512	22.63	562	23 71	612	24.74	662	25.73	712	26.68
513	22.65	563	23.73	613	24.76	663	25.75	713	26.70
514	22.67	564	23.75	614	24.78	664	25.77	714	26.72
515	22.69	565	23.77	615	24.80	665	25.79	715	26.74
516	22.72	566	23.79	616	24.82	666	25.81	716	26.76
517	22.74	567	23.81	617	24.84	667	25.83	717	26.78
518	22.76	568	23.83	618	24.86	668	25.85	718	26.80
519	22.78	569	23.85	619	24.88	669	25.87	719	26.81
520	22.80	570	23.87	620	24.90	670	25.88	720	26.83
521	22.83	571	23.90	621	24.92	671	25.90	721	26.85
522	22.85	572	23.92	622	24.94	672	25.92	722	26.87
523	22.87	573	23.94	623	24.96	673	25.94	723	26.89
524	22.89	574	23.96	624	24.98	674	25.96	724	26.91
525	22.91	575	23.98	625	25.00	675	25.98	725	26.93
526	22.93	576	24.00	626	25.02	676	26.00	726	26.94
527	22.96	577	24.02	627	25.04	677	26.02	727	26.96
528	22.98	578	24.04	628	25.06	678	26.04	728	26.98
529	23.00	579	24.06	629	25.08	679	26.06	729	27.00
530	23.02	580	24.08	630	25.10	680	26.08	730	27.02
531	23.04	581	24.10	631	25.12	681	26.10	731	27.04
532	23.07	582	24.12	632	25.14	682	26.12	732	27.06
533	23.09	583	24.15	633	25.16	683	26.13	733	27.07
534	23.11	584	24.17	634	25.18	684	26.15	734	27.09
535	23.13	585	24.19	635	25.20	685	26.17	735	27.11
536	23.15	586	24.21	636	25.22	686	26.19	736	27.13
537	23.17	587	24.23	637	25.24	687	26.21	737	27.15
538	23.19	588	24.25	638	25.26	688	26.23	738	27.17
539	23.22	589	24.27	639	25.28	689	26.25	739	27.18
540	23.24	590	24.29	640	25.30	690	26.27	740	27.20
541	23.26	591	24.31	641	25.32	691	26.29	741	27.22
542	23.28	592	24.33	642	25.34	692	26.31	742	27.24
543	23.30	593	24.35	643	25.36	693	26.32	743	27.26
544	23.32	594	24.37	644	25.38	694	26.34	744	27.28
545	23.35	595	24.39	645	25.40	695	26.36	745	27.29
546	23.37	596	24.41	646	25.42	696	26.38	746	27.31
547	23.39	597	24.43	647	25.44	697	26.40	747	27.33
548	23.41	598	24.45	648	25.46	698	26.42	748	27.35
549	23.43	599	24.47	649	25.48	699	26.44	749	27.37
550	23.45	600	24.49	650	25.50	700	26.46	750	27.39

TABLE OF SQUARE ROOTS.

Nos.	Roots.	Nos.	Roots.	Nos.	Roots.	Nos.	Roots.	Nos.	Roots.
751	27.40	801	28.30	851	29.17	901	30.02	951	30.84
752	27.42	802	28.32	852	29.19	902	30.03	952	30.85
753	27.44	803	28.34	853	29.21	903	30.05	953	30.87
754	27.46	804	28.35	854	29.22	904	30.07	954	30.89
755	27.48	805	28.37	855	29.24	905	30.08	955	30.90
756	27.50	806	28.39	856	29.26	906	30.10	956	30.92
757	27.51	807	28.41	857	29.27	907	30.12	957	30.94
758	27.53	808	28.43	858	29.29	908	30.13	958	30.95
759	27.55	809	28.44	859	29.31	909	30.15	959	30.97
760	27.57	810	28.46	860	29.33	910	30.17	960	30.98
761	27.59	811	28.48	861	29.34	911	30.18	961	31.00
762	27.60	812	28.50	862	29.36	912	30.20	962	31.02
763	27.62	813	28.51	863	29.38	913	30.22	963	31.03
764	27.64	814	28.53	864	29.39	914	30.23	964	31.05
765	27.66	815	28.55	865	29.41	915	30.25	965	31.06
766	27.68	816	28.57	866	29.43	916	30.27	966	31.08
767	27.69	817	28.58	867	29.44	917	30.28	967	31.10
768	27.71	818	28.60	868	29.46	918	30.30	968	31.11
769	27.73	819	28.62	869	29.48	919	30.32	969	31.13
770	27.75	820	28.64	870	29.50	920	30.33	970	31.14
771	27.77	821	23.65	871	29.51	921	30.35	971	31.16
772	27.78	822	28.67	872	29.53	922	30.36	972	31.18
773	27.80	823	28.69	873	29.55	923	30.38	973	31.19
774	27.82	824	28.71	874	29.56	924	30.40	974	31.21
775	27.84	825	28.72	875	29.58	925	30.41	975	31.22
776	27.86	826	28.74	876	29.60	926	30.43	976	31.24
777	27.87	827	28.76	877	29.61	927	30.45	977	31.26
778	27.89	828	28.77	878	29.63	928	30.46	978	31.27
779	27.91	829	28.79	879	29.65	929	30.48	979	31.29
780	27.93	830	28.81	880	29.66	930	30.50	980	31.30
781	27.95	831	28.83	881	29.68	931	30.51	981	31.32
782	27.96	832	28.84	882	29.70	932	30.53	982	31.34
783	27.98	833	28.86	883	29.72	933	30.55	983	31.35
784	28.00	834	28.88	884	29.73	934	30.56	984	31.37
785	28.02	835	28.90	885	29.75	935	30.58	985	31.38
786	28.04	836	28.91	886	29.77	936	30.59	986	31.40
787	28.05	837	28.93	887	29.78	937	30.61	987	31.42
788	28.07	838	28.95	888	29.80	938	30.63	988	31.43
789	28.09	839	28.97	889	29.82	939	30.64	989	31.45
790	28.11	840	28.98	890	29.83	940	30.66	990	31.46
791	28.12	841	29.00	891	29.85	941	30.68	991	31.48
792	28.14	842	29.02	892	29.87	942	30.69	992	31.50
793	28.16	843	29.03	893	29.88	943	30.71	993	31.51
794	28.18	844	29.05	894	29.90	944	30.72	994	31.53
795	28.20	845	29.07	895	29.92	945	30.74	995	31.54
796	28.21	846	29.09	896	29.93	946	30.76	996	31.56
797	28.23	847	29.10	897	29.95	947	30.77	997	31.58
798	28.25	848	29.12	898	29.97	948	30.79	998	31.59
799	28.27	849	29.14	899	29.98	949	30.81	999	31.61
800	28.28	850	29.15	900	30.00	950	30.82	1000	31.62

TABLE OF SQUARE ROOTS.

Nos.	Roots.	Nos.	Roots.	Nos.	Roots.	Nos.	Roots.	Nos.	Roots.
1001	31.64	1051	32.42	1101	33.18	1151	33.93	1201	34.66
1002	31.65	1052	32.43	1102	33.20	1152	33.94	1202	34.67
1003	31.67	1053	32.45	1103	33.21	1153	33.96	1203	34.68
1004	31.69	1054	32.47	1104	33.23	1154	33.97	1204	34.70
1005	31.70	1055	32.48	1105	33.24	1155	33.99	1205	34.71
1006	31.72	1056	32.50	1106	33.26	1156	34.00	1206	34.73
1007	31.73	1057	32.51	1107	33.27	1157	34.01	1207	34.74
1008	31.75	1058	32.53	1108	33.29	1158	34.03	1208	34.76
1009	31.76	1059	32.54	1109	33.30	1159	34.04	1209	34.77
1010	31.78	1060	32.56	1110	33.32	1160	34.06	1210	34.79
1011	31.80	1061	32.57	1111	33.33	1161	34.07	1211	34.80
1012	31.81	1062	32.59	1112	33.35	1162	34.09	1212	34.81
1013	31.83	1063	32.60	1113	33.36	1163	34.10	1213	34.83
1014	31.84	1064	32.62	1114	33.38	1164	34.12	1214	34.84
1015	31.86	1065	32.63	1115	33.39	1165	34.13	1215	34.86
1016	31.87	1066	32.65	1116	33.41	1166	34.15	1216	34.87
1017	31.89	1067	32.66	1117	33.42	1167	34.16	1217	34.89
1018	31.91	1068	32.68	1118	33.44	1168	34.18	1218	34.90
1019	31.92	1069	32.70	1119	33.45	1169	34.19	1219	34.91
1020	31.94	1070	32.71	1120	33.47	1170	34.21	1220	34.93
1021	31.95	1071	32.73	1121	33.48	1171	34.22	1221	34.94
1022	31.97	1072	32.74	1122	33.50	1172	34.23	1222	34.96
1023	31.98	1073	32.76	1123	33.51	1173	34.25	1223	34.97
1024	32.00	1074	32.77	1124	33.53	1174	34.26	1224	34.99
1025	32.02	1075	32.79	1125	33.54	1175	34.28	1225	35.00
1026	32.03	1076	32.80	1126	33.56	1176	34.29	1226	35.01
1027	32.05	1077	32.82	1127	33.57	1177	34.31	1227	35.03
1028	32.06	1078	32.83	1128	33.59	1178	34.32	1228	35.04
1029	32.08	1079	32.85	1129	33.60	1179	34.34	1229	35.06
1030	32.09	1080	32.86	1130	33.62	1180	34.35	1230	35.07
1031	32.11	1081	32.88	1131	33.63	1181	34.37	1231	35.09
1032	32.12	1082	32.89	1132	33.65	1182	34.38	1232	35.10
1033	32.14	1083	32.91	1133	33.66	1183	34.39	1233	35.11
1034	32.16	1084	32.92	1134	33.67	1184	34.41	1234	35.13
1035	32.17	1085	32.94	1135	33.69	1185	34.42	1235	35.14
1036	32.19	1086	32.95	1136	33.70	1186	34.44	1236	35.16
1037	32.20	1087	32.97	1137	33.72	1187	34.45	1237	35.17
1038	32.22	1088	32.98	1138	33.73	1188	34.47	1238	35.19
1039	32.23	1089	33.00	1139	33.75	1189	34.48	1239	35.20
1040	32.25	1090	33.02	1140	33.76	1190	34.50	1240	35.21
1041	32.26	1091	33.03	1141	33.78	1191	34.51	1241	35.23
1042	32.28	1092	33.05	1142	33.79	1192	34.53	1242	35.24
1043	32.30	1093	33.06	1143	33.81	1193	34.54	1243	35.26
1044	32.31	1094	33.08	1144	33.82	1194	34.55	1244	35.27
1045	32.33	1095	33.09	1145	33.84	1195	34.57	1245	35.28
1046	32.34	1096	33.11	1146	33.85	1196	34.58	1246	35.30
1047	32.36	1097	33.12	1147	33.87	1197	34.60	1247	35.31
1048	32.37	1098	33.14	1148	33.88	1198	34.61	1248	35.33
1049	32.39	1099	33.15	1149	33.90	1199	34.63	1249	35.34
1050	32.40	1100	33.17	1150	33.91	1200	34.64	1250	35.36

TABLE OF SQUARE ROOTS.

Nos.	Roots.	Nos.	Roots.	Nos.	Roots.	Nos.	Roots.	Nos.	Roots.
1251	35.37	1301	36.07	1351	36.76	1401	37.43	1451	38.09
1252	35.38	1302	36.08	1352	36.77	1402	37.44	1452	38.11
1253	35.40	1303	36.10	1353	36.78	1403	37.46	1453	38.12
1254	35.41	1304	36.11	1354	36.80	1404	37.47	1454	38.13
1255	35.43	1305	36.12	1355	36.81	1405	37.48	1455	38.14
1256	55.44	1306	36.14	1356	36.82	1406	37.50	1456	38.16
1257	35.45	1307	36.15	1357	36.84	1407	37.51	1457	38.17
1258	35.47	1308	36.17	1358	36.85	1408	37.52	1458	38.18
1259	35.48	1309	36.18	1359	36.86	1409	37.54	1459	38.20
1260	35.50	1310	36.19	1360	36.88	1410	37.55	1460	38.21
1261	35.51	1311	36.21	1361	36.89	1411	37.56	1461	38.22
1262	35.52	1312	36.22	1362	36.91	1412	37.58	1462	38.24
1263	35.54	1313	36.24	1363	36.92	1413	37.59	1463	38.25
1264	35.55	1314	36.25	1364	36.93	1414	37.60	1464	38.26
1265	35.57	1315	36.26	1365	36.95	1415	37.62	1465	38.28
1266	35.58	1316	36.28	1366	36.96	1416	37.63	1466	38.29
1267	35.59	1317	36.29	1367	36.97	1417	37.64	1467	38.30
1268	35.61	1318	36.30	1368	36.99	1418	37.66	1468	38.31
1269	35.62	1319	36.32	1369	37.00	1419	37.67	1469	38.33
1270	35.64	1320	36.33	1370	37.01	1420	37.68	1470	38.34
1271	35.65	1321	36.35	1371	37.03	1421	37.70	1471	38.35
1272	35.67	1322	36.36	1372	37.04	1422	37.71	1472	38.37
1273	35.68	1323	36.37	1373	37.05	1423	37.72	1473	38.38
1274	35.69	1324	36.39	1374	37.07	1424	37.74	1474	38.39
1275	35.71	1325	36.40	1375	37.08	1425	37.75	1475	38.41
1276	35.72	1326	36.41	1376	37.09	1426	37.76	1476	38.42
1277	35.74	1327	36.43	1377	37.11	1427	37.78	1477	38.43
1278	35.75	1328	36.44	1378	37.12	1428	37.79	1478	38.44
1279	35.76	1329	36.46	1379	37.13	1429	37.80	1479	38.46
1280	35.78	1330	36.47	1380	37.15	1430	37.82	1480	38.47
1281	35.79	1331	36.48	1381	37.16	1431	37.83	1481	38.48
1282	35.81	1332	36.50	1382	37.18	1432	37.84	1482	38.50
1283	35.82	1333	36.51	1383	37.19	1433	37.85	1483	38.51
1284	35.83	1334	36.52	1384	37.20	1434	37.87	1484	38.52
1285	35.85	1335	36.54	1385	37.22	1435	37.88	1485	38.54
1286	35.86	1336	36.55	1386	37.23	1436	37.89	1486	38.55
1287	35.87	1337	36.57	1387	37.24	1437	37.91	1487	38.56
1288	35.89	1338	36.58	1388	37.26	1438	37.92	1488	38.57
1289	35.90	1339	36.59	1389	37.27	1439	37.93	1489	38.59
1290	35.92	1340	36.61	1390	37.28	1440	37.95	1490	38.60
1291	35.93	1341	36.62	1391	37.30	1441	37.96	1491	38.61
1292	35.94	1342	36.63	1392	37.31	1442	37.97	1492	38.63
1293	35.96	1343	36.65	1393	37.32	1443	37.99	1493	38.64
1294	35.97	1344	36.66	1394	37.34	1444	38.00	1494	38.65
1295	35.99	1345	36.67	1395	37.35	1445	38.01	1495	38.67
1296	36.00	1346	36.69	1396	37.36	1446	38.03	1496	38.68
1297	36.01	1347	36.70	1397	37.38	1447	38.04	1497	38.69
1298	36.03	1348	36.72	1398	37.39	1448	38.05	1498	38.70
1299	36.04	1349	36.73	1399	37.40	1449	38.07	1499	38.72
1300	36.06	1350	36.74	1400	37.42	1450	38.08	1500	38.73

TABLE OF SQUARE ROOTS.

Nos.	Roots.	Nos.	Roots.	Nos.	Roots.	Nos.	Roots.	Nos.	Roots.
1501	38.74	1551	39.38	1601	40.01	1651	40.63	1701	41.24
1502	38.76	1552	39.40	1602	40.02	1652	40.64	1702	41.26
1503	38.77	1553	39.41	1603	40.04	1653	40.66	1703	41.27
1504	38.78	1554	39.42	1604	40.05	1654	40.67	1704	41.28
1505	38.79	1555	39.43	1605	40.06	1655	40.68	1705	41.29
1506	38.81	1556	39.45	1606	40.07	1656	40.69	1706	41.30
1507	38.82	1557	39.46	1607	40.09	1657	40.71	1707	41.32
1508	38.83	1558	39.47	1608	40.10	1658	40.72	1708	41.33
1509	38.85	1559	39.48	1609	40.11	1659	40.73	1709	41.34
1510	38.86	1560	39.50	1610	40.12	1660	40.74	1710	41.35
1511	38.87	1561	39.51	1611	40.14	1661	40.76	1711	41.36
1512	38.88	1562	39.52	1612	40.15	1662	40.77	1712	41.38
1513	38.90	1563	39.53	1613	40.16	1663	40.78	1713	41.39
1514	38.91	1564	39.55	1614	40.17	1664	40.79	1714	41.40
1515	38.92	1565	39.56	1615	40.19	1665	40.80	1715	41.41
1516	38.94	1566	39.57	1616	40.20	1666	40.82	1716	41.42
1517	38.95	1567	39.59	1617	40.21	1667	40.83	1717	41.44
1518	38.96	1568	39.60	1618	40.22	1668	40.84	1718	41.45
1519	38.97	1569	39.61	1619	40.24	1669	40.85	1719	41.46
1520	38.99	1570	39.62	1620	40.25	1670	40.87	1720	41.47
1521	39.00	1571	39.64	1621	40.26	1671	40.88	1721	41.48
1522	39.01	1572	39.65	1622	40.27	1672	46.89	1722	41.50
1523	39.03	1573	39.66	1623	40.29	1673	40.90	1723	41.51
1524	39.04	1574	39.67	1624	40.30	1674	40.91	1724	41.52
1525	39.05	1575	39.69	1625	40.31	1675	40.93	1725	41.53
1526	39.06	1576	39.70	1626	40.32	1676	40.94	1726	41.55
1527	39.08	1577	39.71	1627	40.34	1677	40.95	1727	41.56
1528	39.09	1578	39.72	1628	40.35	1678	40.96	1728	41.57
1529	39.10	1579	39.74	1629	40.36	1679	40.98	1729	41.58
1530	39.12	1580	39.75	1630	40.37	1680	40.99	1730	41.59
1531	39.13	1581	39.76	1631	40.39	1681	41.00	1731	41.61
1532	39.14	1582	39.77	1632	40.40	1682	41.01	1732	41.62
1533	39.15	1583	39.79	1633	40.41	1683	41.02	1733	41.63
1534	39.17	1584	39.80	1634	40.42	1684	41.04	1734	41.64
1535	39.18	1585	39.81	1635	40.44	1685	41.05	1735	41.65
1536	39.19	1586	39.82	1636	40.45	1686	41.06	1736	41.67
1537	39.20	1587	39.84	1637	40.46	1687	41.07	1737	41.68
1538	39.22	1588	39.85	1638	40.47	1688	41.09	1738	41.69
1539	39.23	1589	39.86	1639	40.48	1689	41.10	1739	41.70
1540	39.24	1590	39.87	1640	40.50	1690	41.11	1740	41.71
1541	39.26	1591	39.89	1641	40.51	1691	41.12	1741	41.73
1542	39.27	1592	39.90	1642	40.52	1692	41.13	1742	41.74
1543	39.28	1593	39.91	1643	40.53	1693	41.15	1743	41.75
1544	39.29	1594	39.92	1644	40.55	1694	41.16	1744	41.76
1545	39.31	1595	39.94	1645	40.56	1695	41.17	1745	41.77
1546	39.32	1596	39.95	1646	40.57	1696	41.18	1746	41.79
1547	39.33	1597	39.96	1647	40.58	1697	41.19	1747	41.80
1548	39.34	1598	39.97	1648	40.60	1698	41.21	1748	41.81
1549	39.36	1599	39.99	1649	40.61	1699	41.22	1749	41.82
1550	39.37	1600	40.00	1650	40.62	1700	41.23	1750	41.83

TABLE OF SQUARE ROOTS.

Nos.	Roots.	Nos.	Roots.	Nos.	Roots.	Nos.	Roots.	Nos.	Roots.
1751	41.85	1801	42.44	1851	43.02	1901	43.60	1951	44.17
1752	41.86	1802	42.45	1852	43.03	1902	43.61	1952	44.18
1753	41.87	1803	42.46	1853	43.05	1903	43.62	1953	44.19
1754	41.88	1804	42.47	1854	43.06	1904	43.63	1954	44.20
1755	41.89	1805	42.49	1855	43.07	1905	43.65	1955	44.22
1756	41.90	1806	42.50	1856	43.08	1906	43.66	1956	47.23
1757	41.92	1807	42.51	1857	43.09	1907	43.67	1957	44.24
1758	41.93	1808	42.52	1858	43.10	1908	43.68	1958	44.25
1759	41.94	1809	42.53	1859	43.12	1909	43.69	1959	44.26
1760	41.95	1810	42.54	1860	43.13	1910	43.70	1960	44.27
1761	41.96	1811	42.56	1861	43.14	1911	43.71	1961	44.28
1762	41.98	1812	42.57	1862	43.15	1912	43.73	1962	44.29
1763	41.99	1813	42.58	1863	43.16	1913	43.74	1963	44.31
1764	42.00	1814	42.59	1864	43.17	1914	43.75	1964	44.32
1765	42.01	1815	42.60	1865	43.19	1915	43.76	1965	44.33
1766	42.02	1816	42.61	1866	43.20	1916	43.77	1966	44.34
1767	42.04	1817	42.63	1867	43.21	1917	43.78	1967	44.35
1768	42.05	1818	42.64	1868	43.22	1918	43.79	1968	44.36
1769	42.06	1819	42.65	1969	43.23	1919	43.81	1969	44.37
1770	42.07	1820	42.66	1870	43.24	1920	43.82	1970	44.38
1771	42.08	1821	42.67	1871	43.26	1921	43.83	1971	44.40
1772	42.10	1822	42.68	1872	43.27	1922	43.84	1972	44.41
1773	42.11	1823	42.70	1873	43.28	1923	43.85	1973	44.42
1774	42.12	1824	42.71	1874	43.29	1924	43.86	1974	44.43
1775	42.13	1825	42.72	1875	43.30	1925	43.87	1975	44.44
1776	42.14	1826	42.73	1876	43.31	1926	43.89	1976	44.45
1777	42.15	1827	42.74	1877	43.32	1927	43.90	1977	44.46
1778	42.17	1828	42.76	1878	43.34	1928	43.91	1978	44.47
1779	42.18	1829	42.77	1879	43.35	1929	43.92	1979	44.49
1780	42.19	1830	42.78	1880	43.36	1930	43.93	1980	44.50
1781	42.20	1831	42.79	1881	43.37	1931	43.94	1981	44.51
1782	42.21	1832	42.80	1882	43.38	1932	43.95	1982	44.52
1783	42.23	1833	42.81	1883	43.39	1933	43.97	1983	44.53
1784	42.24	1834	42.83	1884	43.41	1934	43.98	1984	44.54
1785	42.25	1835	42.84	1885	43.42	1935	43.99	1985	44.55
1786	42.26	1836	42.85	1886	43.43	1936	44.00	1986	44.56
1787	42.27	1837	42.86	1887	43.44	1937	44.01	1987	44.58
1788	42.28	1838	42.87	1888	43.45	1938	44.02	1988	44.59
1789	42.30	1839	42.88	1889	43.46	1939	44.03	1989	44.60
1790	42.31	1840	42.90	1890	43.47	1940	44.05	1990	44.61
1791	42.32	1841	42.91	1891	43.49	1941	44.06	1991	44.62
1792	42.33	1842	42.92	1892	43.50	1942	44.07	1992	44.63
1793	42.34	1843	42.93	1893	43.51	1943	44.08	1993	44.64
1794	42.36	1844	42.94	1894	43.52	1944	44.09	1994	44.65
1795	42.37	1845	42.95	1895	43.53	1945	44.10	1995	44.67
1796	42.38	1846	42.97	1896	43.54	1946	44.11	1996	44.68
1797	42.39	1847	42.98	1897	43.55	1947	44.12	1997	44.69
1798	42.40	1848	42.99	1898	43.57	1948	44.14	1998	44.70
1799	42.41	1849	43.00	1899	43.58	1949	44.15	1999	44.71
1800	42.43	1850	43.01	1900	43.59	1950	44.16	2000	44.72

BENDING MOMENTS (FOOT POUNDS.)

For Various Loads and Lengths of Span, assuming Joists Spaced 24 Inches Center to Center.

Loads Per Sq. Foot.	Loads Per Lin. Foot.	LENGTH OF SPAN IN FEET.											
		10	11	12	13	14	15	16	17	18	19	20	22
15	30	375	454	540	634	735	844	960	1084	1215	1354	1500	1815
20	40	500	605	720	845	980	1125	1280	1445	1620	1805	2000	2420
25	50	625	756	900	1056	1225	1406	1600	1806	2025	2256	2500	3025
30	60	750	908	1080	1268	1470	1688	1920	2168	2430	2708	3000	3630
40	80	1000	1210	1440	1690	1960	2250	2560	2890	3240	3610	4000	4840
50	100	1250	1513	1800	2113	2450	2813	3200	3613	4050	4513	5000	6050
60	120	1500	1815	2160	2535	2940	3375	3840	4335	4860	5415	6000	7260
70	140	1750	2118	2520	2958	3430	3938	4480	5058	5670	6318	7000	8470
75	150	1875	2269	2700	3169	3675	4219	4800	5419	6075	6769	7500	9075
80	160	2000	2420	2880	3380	3920	4500	5120	5780	6480	7220	8000	9680
100	200	2500	3025	3600	4225	4900	5625	6400	7225	8100	9025	10000	12100
125	250	3125	3781	4500	5281	6125	7031	8000	9031	10125	11281	12500	15125
150	300	3750	4538	5400	6338	7350	8438	9600	10838	12150	13538	15000	18150
175	350	4375	5294	6300	7394	8575	9844	11200	12644	14175	15794	17500	21175
200	400	5000	6050	7200	8450	9800	11250	12800	14450	16200	18050	20000	24200
250	500	6250	7563	9000	10563	12250	14063	16000	18063	20250	22563	25000	30250

TIMBER BEAMS OR JOISTS.

Capacity in Bending Moments (Foot Pounds) for 1000 Pounds Per Square Inch, Fiber Strain.

Width, Inches.	DEPTH OF BEAM IN INCHES.											
	6	7	8	9	10	12	14	15	16	18	20	24
2	1000	1361	1778	2250	2778	4000	5444	6250	. .	. .	. .	. .
2½	1250	1701	2222	2813	3472	5000	6806	7813	8889	. .	. .	. .
3	1500	2042	2667	3375	4167	6000	8167	9375	10667	13500	. .	. .
3½	1750	2382	3111	3938	4861	7000	9528	10938	12444	15750	19444	. .
4	2000	2722	3556	4500	5556	8000	10889	12500	14222	18000	22222	32000
4½	2250	3062	4000	5063	6250	9000	12250	14063	16000	20250	25000	36000
5	2500	3403	4444	5625	6944	10000	13611	15625	17778	22500	27778	40000
5½	2750	3743	4889	6188	7639	11000	14972	17188	19556	24750	30556	44000
6	3000	4083	5333	6750	8333	12000	16333	18750	21333	27000	33333	48000
7	. .	4764	6222	7875	9722	14000	19056	21875	24889	31500	38889	56000
8	. .	. .	7111	9000	11111	16000	21778	25000	28444	36000	44444	64000
9	. .	. .	. .	10125	12500	18000	24500	28125	32000	40500	50000	72000
10	. .	. .	. .	. .	13889	20000	27222	31250	35556	45000	55556	80000
12	. .	. .	. .	. .	. .	24000	32667	37500	42667	54000	66667	96000

TIMBER BEAMS OR JOISTS.

Capacity in Bending Moments (Foot Pounds) for 1200 Pounds Per Square Inch, Fiber Strain.

Width, Inches.	DEPTH OF BEAM IN INCHES.											
	6	7	8	9	10	12	14	15	16	18	20	24
2	1200	1633	2133	2700	3333	4800	6533	7500	. .	. .	. .	. .
2½	1500	2042	2667	3375	4167	6000	8167	9375	10667	.	. .	. .
3	1800	2450	3200	4050	5000	7200	9800	11250	12800	16200	. .	. .
3½	2100	2858	3733	4725	5833	8400	11433	13125	14933	18900	23333	. .
4	2400	3267	4267	5400	6667	9600	13067	15000	17067	21600	26667	38400
4½	2700	3675	4800	6075	7500	10800	14700	16875	19200	24300	30000	43200
5	3000	4083	5333	6750	8333	12000	16333	18750	21333	27000	33333	48000
5½	3300	4492	5867	7425	9167	13200	17967	20625	23467	29700	36667	52800
6	3600	4900	6400	8100	10000	14400	19600	22500	25600	32400	40000	57600
7	. .	5717	7467	9450	11667	16800	22867	26250	29867	37800	46667	67200
8	. .	. .	8533	10800	13333	19200	26133	30000	34133	43200	53333	76800
9	. .	. .	. .	12150	15000	21600	29400	33750	38400	48600	60000	86400
10	. .	. .	. .	. .	16667	24000	32667	37500	42667	54000	66667	96000
12	. .	. .	. .	. .	. .	28800	39200	45000	51200	64800	80000	115200

TIMBER BEAMS OR JOISTS.

Capacity in Bending Moments (Foot Pounds) for 1500 Pounds Per Square Inch, Fiber Strain.

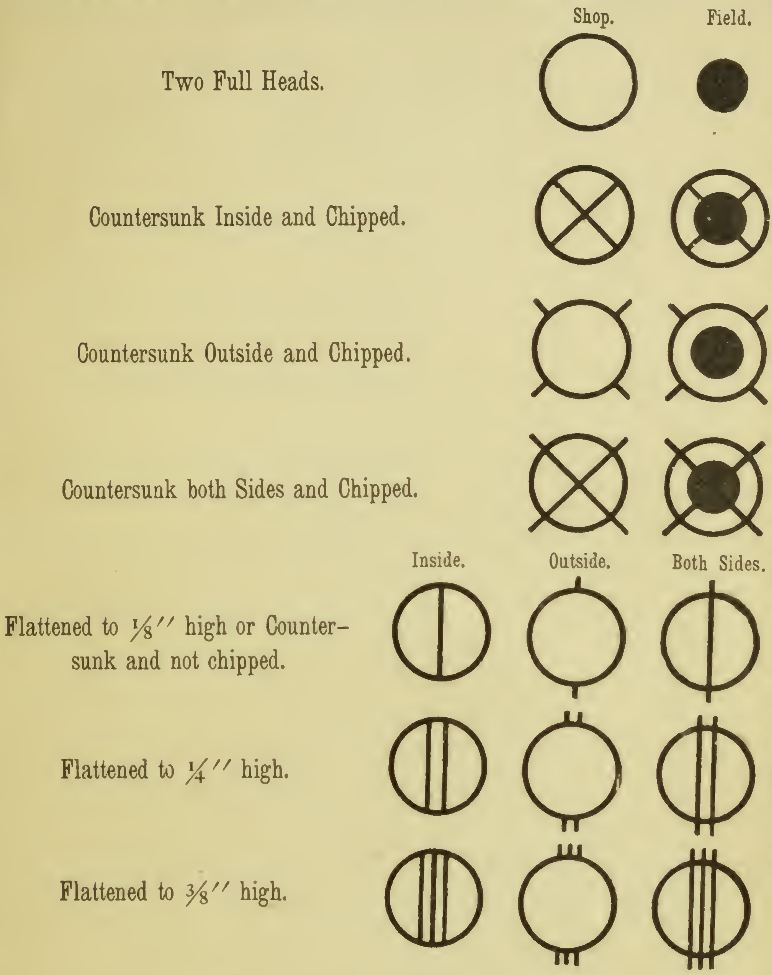
Width, Inches.	DEPTH OF BEAM IN INCHES.											
	6	7	8	9	10	12	14	15	16	18	20	24
2	1500	2042	2667	3375	4167	6000	8167	9375	. .	. .	. .	. .
2½	1875	2552	3333	4219	5208	7500	10208	11719	13333	. .	. .	. .
3	2250	3063	4000	5063	6250	9000	12250	14063	16000	20250	. .	. .
3½	2625	3573	4667	5906	7292	10500	14292	16406	18667	23625	29167	. .
4	3000	4083	5333	6750	8333	12000	16333	18750	21333	27000	33333	48000
4½	3375	4594	6000	7594	9375	13500	18375	21094	24000	30375	37500	54000
5	3750	5104	6667	8438	10417	15000	20417	23438	26667	33750	41667	60000
5½	4125	5615	7333	9281	11458	16500	22458	25781	29333	37125	45833	66000
6	4500	6125	8000	10125	12500	18000	24500	28125	32000	40500	50000	72000
7	. .	7146	9333	11813	14583	21000	28583	32813	37333	47250	58333	84000
8	. .	. .	10667	13500	16667	24000	32667	37500	42667	54000	66667	96000
9	. .	. .	. .	15188	18750	27000	36750	42188	48000	60750	75000	108000
10	. .	. .	. .	. .	20833	30000	40833	46875	53333	67500	83333	120000
12	. .	. .	. .	. .	. .	36000	49000	56250	64000	81000	100000	144000

OSBORN'S CODE FOR BRIDGE RIVETS.

ADOPTED AS STANDARD BY

Union Bridge Co.,	Athens, Pa.
Union Bridge Co.,	Buffalo, N. Y.
Edge Moor Bridge Works,	Edge Moor, Del.
Keystone Bridge Co.	Pittsburgh, Pa.
Shiffler Bridge Works,	"
Pittsburgh Bridge Co.,	"
Riter & Conley,	"
Iron City Bridge Works,	Chartiers, Pa.
Phœnix Bridge Works,	Phœnixville, Pa.
New Jersey Steel and Iron Co.	Trenton, N. J.
King Iron Bridge and Manuf. Co.,	Cleveland, Ohio.
Variety Iron Works,	"
Mt. Vernon Bridge Co.,	Mt. Vernon, Ohio.
Wrought Iron Bridge Co.,	Canton, Ohio.
Massillon Bridge Co.,	Massillon, Ohio.
Columbus Bridge Co.,	Columbus, Ohio.
Penn Bridge Co.,	Beaver Falls, Pa.
Groton Bridge and Manufacturing Co.,	Groton, N. Y.
California Bridge Co.,	San Francisco, Cal.
Atlanta Bridge and Axle Works,	Atlanta, Ga.
Chicago Forge and Bolt Works,	Chicago, Ill.
Shailer & Schniglau,	"
Smith Bridge Co.	Toledo, Ohio.
Decatur Iron Bridge and Const'n Co ,	Decatur, Ala.
Levering & Garrigues,	Philadelphia, Pa.
G. Bouscaren, Consulting Engineer,	Cincinnati, Ohio.
S. Diescher, " "	Pittsburgh, Pa.
Morison & Corthell, " "	New York and Chicago.
John W. Berry, Bridge Builder,	Pittston, Pa
Baltimore & Ohio Railroad Co.,	Baltimore, Md.
Richmond & Danville Railway Co.,	Washington, D. C.
Wheeling & Lake Erie Railway,	Toledo, Ohio.
Louisville Southern Railway,	Louisville, Ky.
Lake Shore & Mich. Southern Ry. Co.,	Cleveland, Ohio.
New York Central Railway Co.,	New York City.

CONVENTIONAL SIGNS FOR BRIDGE RIVETS.


Shop.
Field.
Two Full Heads.
Countersunk Inside and Chipped.
Countersunk Outside and Chipped.
Countersunk both Sides and Chipped.
Inside.
Outside.
Both Sides.
Flattened to ⅛″ high or Countersunk and not chipped.
Flattened to ¼″ high.
Flattened to ⅜″ high.

The foundation of the above system is the diagonal cross to represent a countersink, the blackened circle for a field rivet, and the vertical stroke to indicate a flattened head. The position of the cross with respect to the circle (inside, outside or both sides) indicates the location of the countersink, and the number and position of the vertical strokes indicate the height and position of the flattened heads.

Any combination of field, countersunk and flattened head rivets liable to occur may be readily indicated by the proper combination of the above signs.

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TABLES OF MOMENTS OF INERTIA AND SQUARES
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